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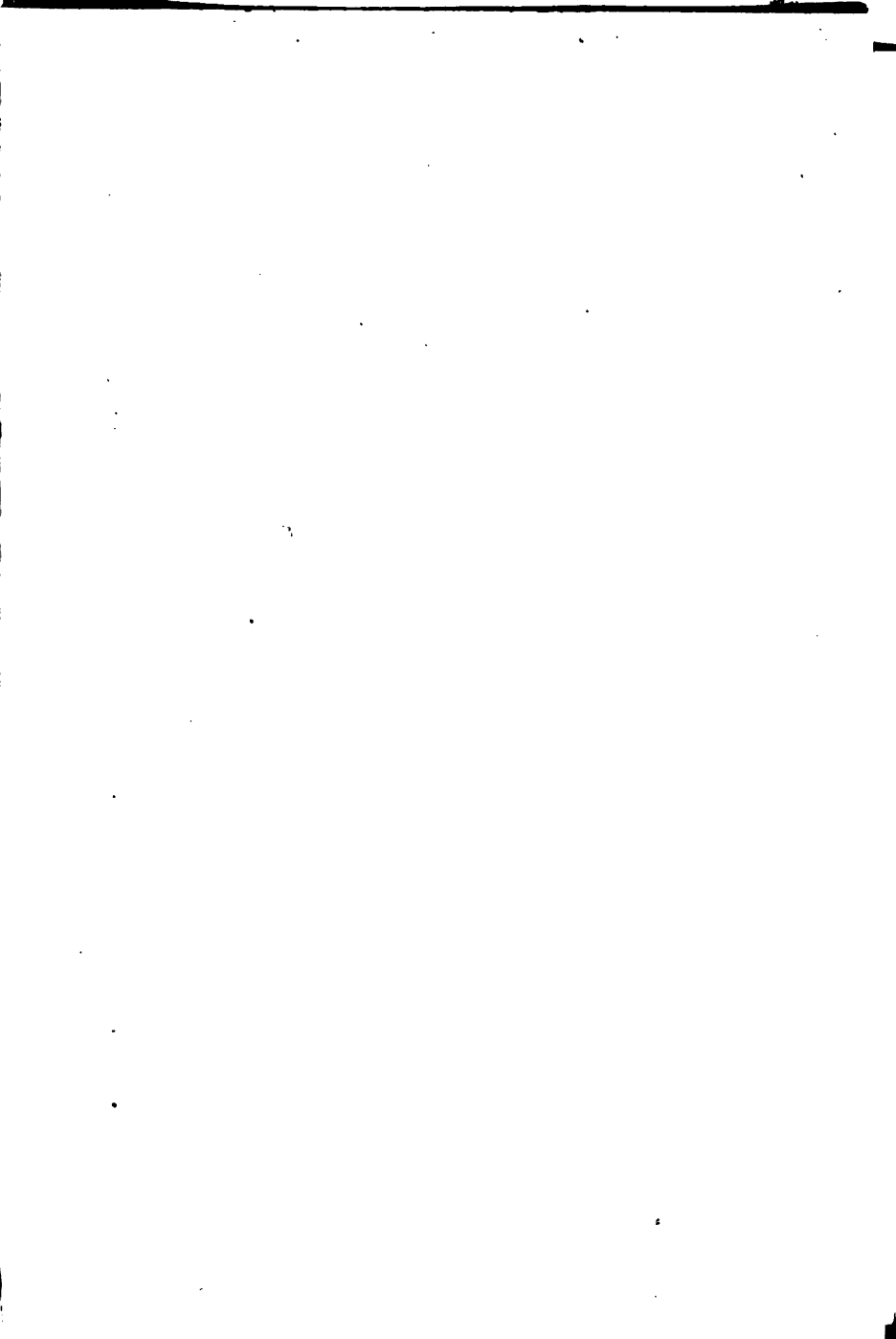
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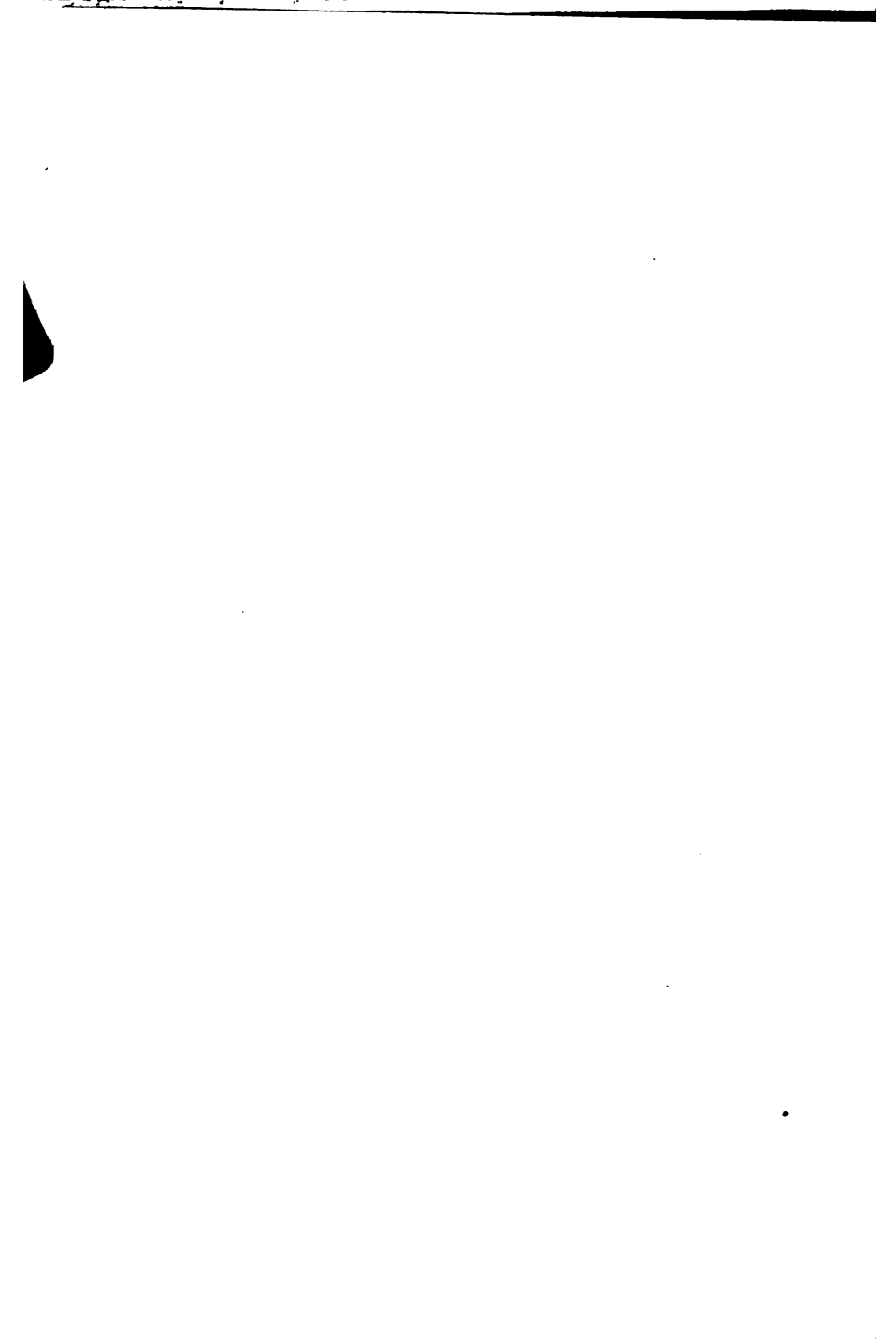
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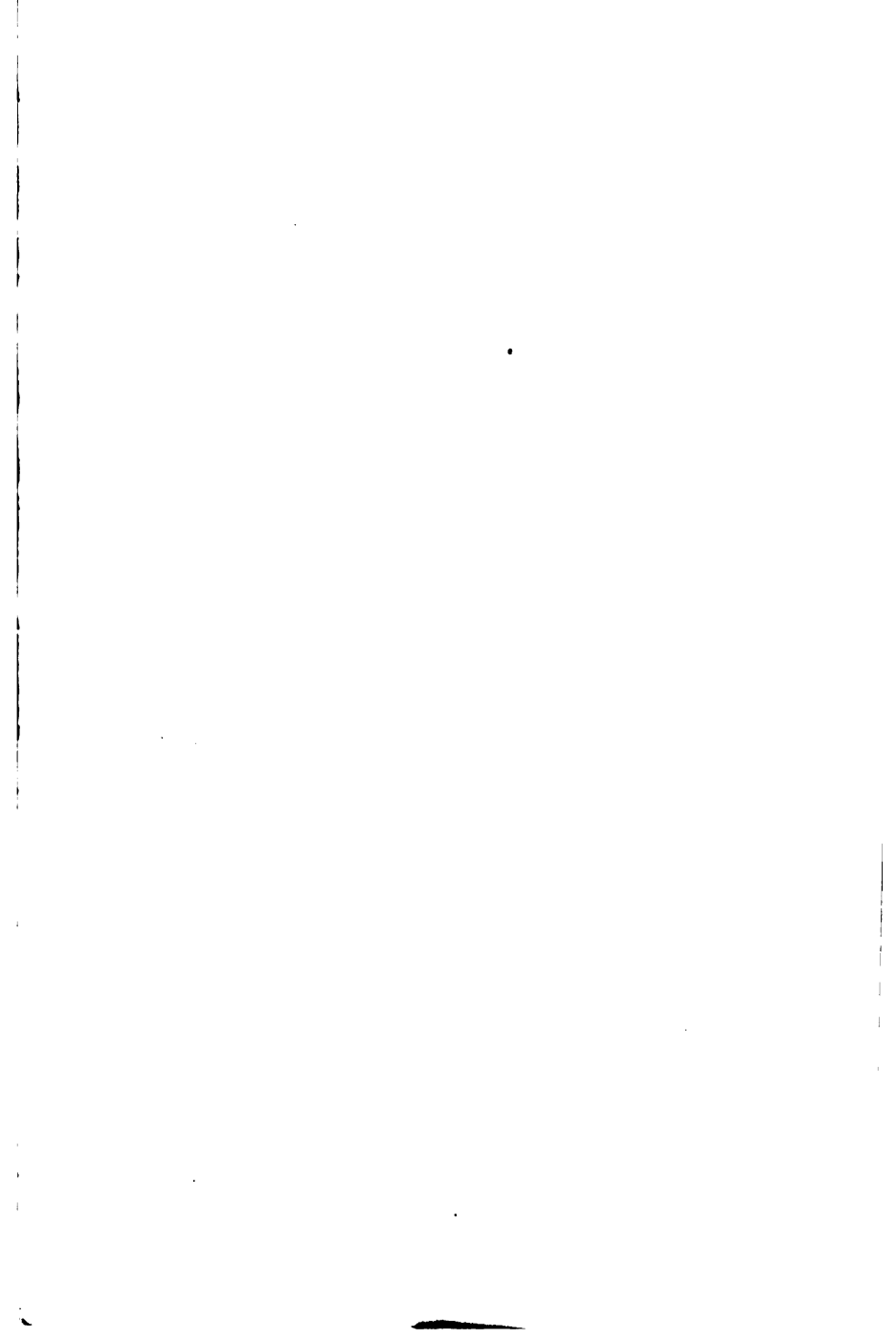
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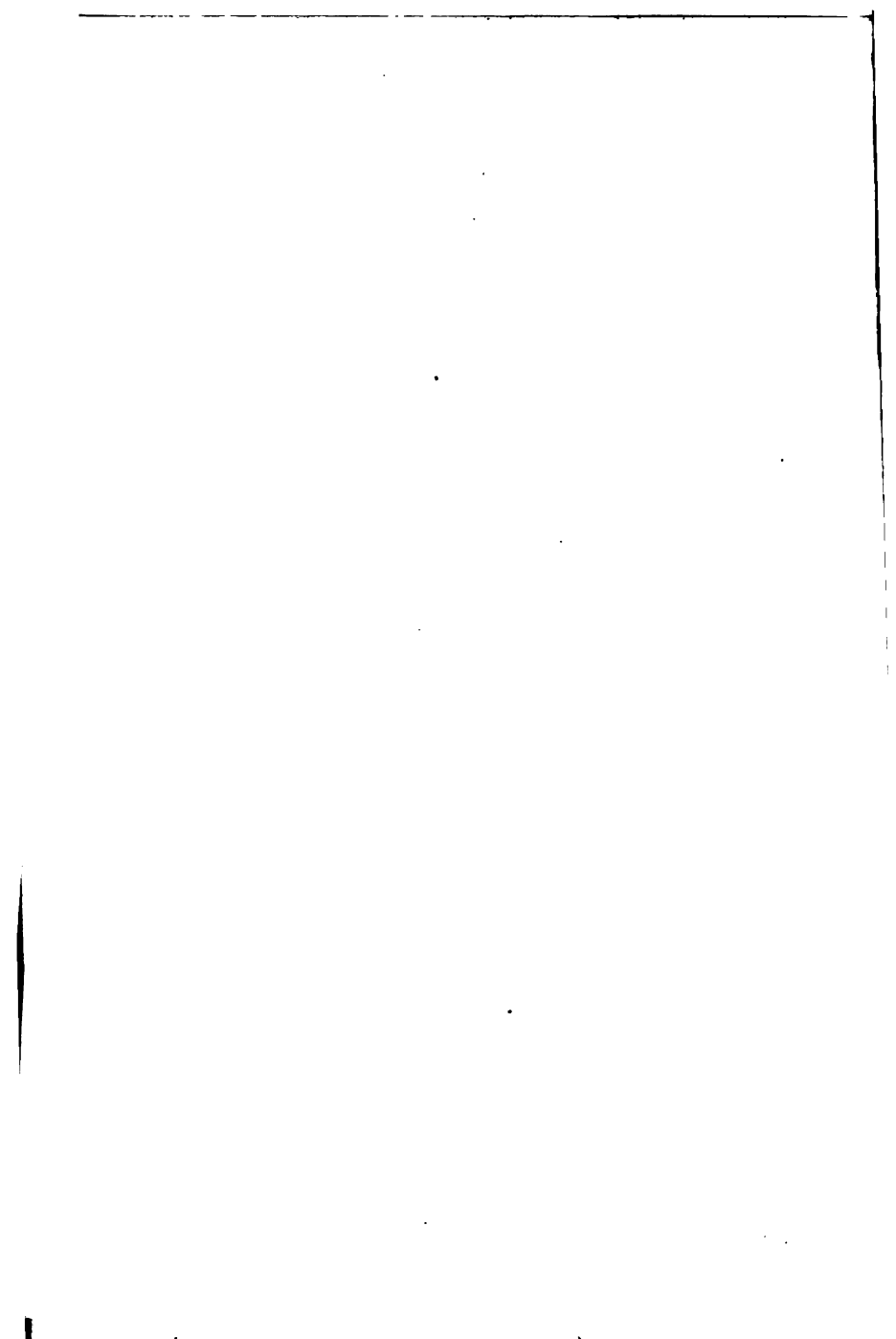
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V. 5000

GUIDE

TO THE

FIELD COLUMBIAN MUSEUM



WITH DIAGRAMS AND DESCRIPTIONS

SECOND EDITION.

CHICAGO :

1894.

The Field Columbian Museum will be open to the public every day, from 9 A. M. to 4 P. M., except during June, July and August, when the hour for closing will be 6 P. M.

Admission will be free Saturdays and Sundays. On other days the entrance fee will be twenty-five cents; children under twelve years of age, ten cents.

Scholars attending any school in Chicago will be admitted free to the Museum on all days upon presentation of proper certificate from teacher or proper school officer.

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7

GUIDE

TO THE

FIELD COLUMBIAN MUSEUM

COMPLIMENTS OF

F. J. V. SKIFF,
DIRECTOR.

WITH DIAGRAMS AND DESCRIPTIONS

SECOND EDITION.

CHICAGO:

1894.

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The Museum

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FIELD COLUMBIAN MUSEUM.

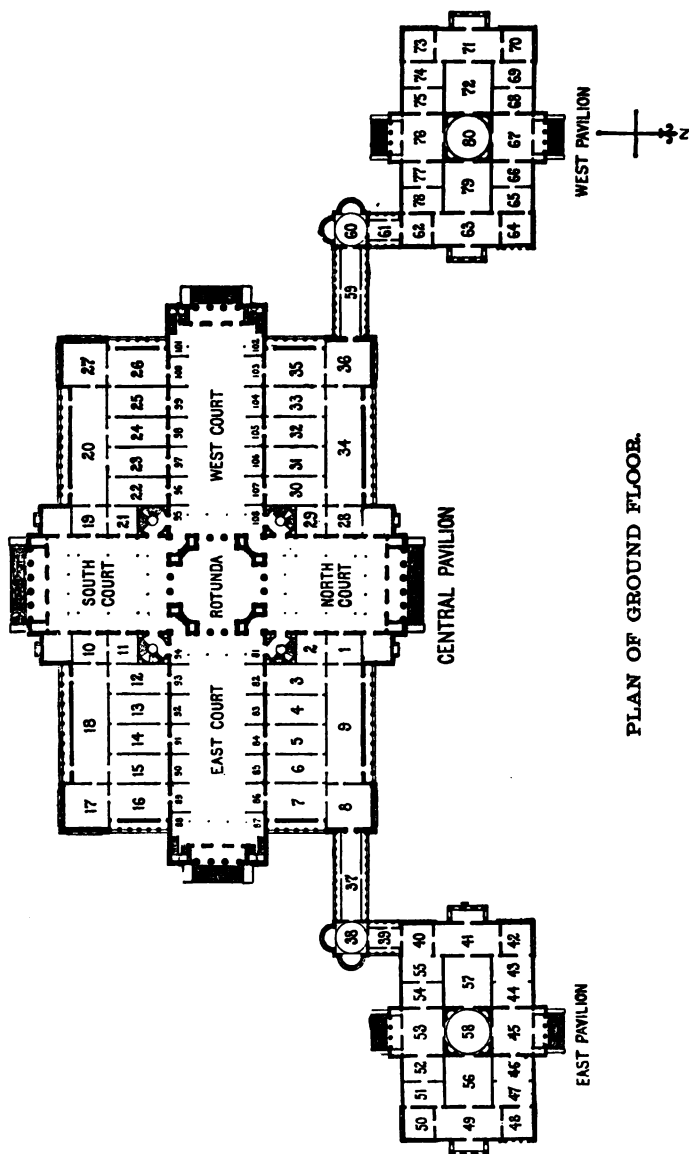
INTRODUCTION.

The Guide locates, by means of plans and a system of numbers, the principle objects of interest in the Halls, Courts, Alcoves, and Galleries. The diagrams are accompanied by brief descriptions. The Columbian Rotunda and the Columbus Memorial Halls are described first because of the historical significance attached to them. Then follow descriptions of the Courts and Departments. The latter are taken up separately in the order of their usual sequence, beginning with Natural History—Geology, Botany, and Zoology—and concluding with the Departments relating to Man and His Works—Anthropology, Industrial Arts, and the Rail Way.

If a general view of the entire Museum is desired, it is suggested that the Departments be visited in the order above indicated. After viewing the Columbian Rotunda (see page 9) the visitor may proceed through the Reading Room and Lecture Hall to the West Pavilion, where are installed the collections of Geology (see page 27). The Halls should be visited in the following order: 35, 36, and 59—Paleontology; 60 and 61—Geographic Geology; 62, 63, and 64—Meteorites and Mineralogy; 65—Dynamic Geology; 66 Lithology; 67 to 80 inclusive—Economic Geology.

Returning to the West Court through Hall 35 the Botanical collections may be reached by the stairway in Alcove 102. The circuit of the galleries should be made from the West to the North, then to the East and finally to the South Gallery. The Botanical collections are arranged on a geographical basis, and begin on the South Gallery with specimens from Asia, Europe, Africa, and follow with the South and North American Series. (See page 91.)

The Laboratory of Physical and Psychical Anthropology will be found on the gallery at the extreme end of the East Court. (See page 129.)



PLAN OF GROUND FLOOR.

After descending to the main floor the visitor may proceed to south side of the West Court and should visit the Halls of the Zoological Department in the following order: Halls 24, 25, 26, 27, and 20. (See page 109). Hall 20 leads into the Division of the Fishery Industry in Hall 23 and the Animal Industry in Hall 22. These two halls belong to the Department of Industrial Arts. (See pages 170 and 173.)

The Department of Anthropology (see page 125) can be entered upon in the South Court and may be further studied in Halls 10 and 11, devoted to the Eskimo; 12 and 13—the North Pacific Coast; 18—Prehistoric Tribes of North America; 14, 15, 16, and 17—South American collections; the Alcoves of the East Court contain exhibits relating to the Ethnology and Archæology of America. Halls 2 to 7 inclusive, as well as the North Court, are devoted to collections illustrating the anthropology of Europe, Asia, and Africa.

The Columbus Memorial (see page 11) installed in Halls 1, 9, and 8, may now be visited advantageously; they lead into the section of Transportation (see page 197) located in Halls 37, 38, 39, 40, 54, and 55. Hall 54 contains the initial exhibits of Department of the Rail Way (see page 211) which occupies the remainder of the East Pavilion.

Returning now to the center of the main building the visitor may proceed to the remainder of the Industrial Art Collections—Ceramics, Hall 30; Textiles, Hall 31; and Gems and Jewels, Hall 32. (See pages 177, 181, and 187 respectively.)

An account of the Library and Lecture Hall is added. (See page 239.) In the Appendix will be found an alphabetical list of all donors, loan contributors, and collectors. (See page 243.)

The following indices are inserted for the use of those who desire to study a single Department or subject.

INDEX TO HALLS.

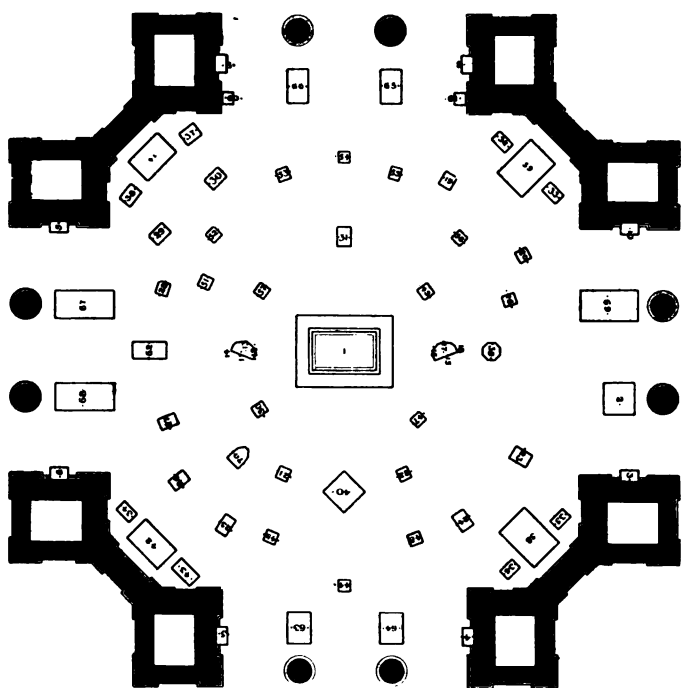
Collections in each hall are described on page of Guide under hall number.

Hall	1	2	3	4	5	6	7	8	9	10	11
Page	17	133	133	135	137	139	141	21	13	151	153
Hall	12	13	14	15	16	17	18	20	22	23	24
Page	155	157	159	161	163	165	167	123	170	173	113
Hall	25	26	27	28	29	30	31	32	33	34	35
Page	115	119	121	241	239	177	181	187	193	241	29
Hall	36	37	38	39	40	41	42	43	44	45	46
Page	29	199	203	201	205	233	231	229	229	227	225
Hall	47	48	49	50	51	52	53	54	55	56	57
Page	225	223	219	217	215	215	213	209	205	221	235
Hall	58	59	60	61	62	63	64	65	66	67	68
Page	237	29	43	43	47	51	51	55	57	63	63
Hall	69	70	71	72	73	74	75	76	77	78	79
Page	65	67	69	73	77	77	77	195	79	81	83
Hall	80	West Court			East Court		North Court		South Court		
Page	89	23, 110			25, 145		24, 131		24, 147		
Rotunda	West Gallery			East Gallery		North Gallery		South Gallery			
Page	97			105, 129		103		92			

INDEX TO SUBJECTS

	HALLS.	PAGE.
Introduction,		3
Plan of the Museum,		4
Exposition Memorial,	Rotunda	9
Columbus Memorial,	1, 8, 9	11
The West, East, North and South Courts,		23
Department of Geology,		27
<i>Division of Systematic Geology,</i>		27
Paleontology,	35, 36, 59	29
Geographic Geology,	60, 61	43
Meteorites,	62	47
Systematic Mineralogy,	63, 64	51
Structural and Dynamical Geology,	65	55
Lithology,	66	57
<i>Division of Economic Geology,</i>		61
Quarry Products,	67, 68	63
Carbon Minerals,	69, 70, 71	65
Platinum, Gold, Silver and Lead,	72	73
Fictile Materials, Etc.,	77	79

Minerals Used in Chemical Manufacture, Etc.,	78	81
Copper, Iron and Nickel Groups,	79	83
Mineral Trophies, Etc.,	80	89
Department of Botany and Plant Economics,		91
Illinois and Russia,	South Gallery	92
Corea and Japan,	" "	93
British India and Ceylon,	" "	95
Johore,	" "	97
Siam, Turkey and Spain,	West "	97
New South Wales, South Sea Islands, Liberia and Paraguay,	" "	98
Brazil,	" "	99
Ecuador, Colombia and Venezuela,	" "	100
British Guiana, Trinidad, Curacao and Guatemala,	" "	101
Jamaica and Mexico,	" "	103
Economic Plants	North "	104
Sylvia of the United States	" "	105
Department of Zoology,		109
Lower Invertebrates	24	113
Higher Invertebrates,	25	115
Ornithology,	26	119
Osteology,	27	121
Vertebrate Zoology,	20	123
Department of Anthropology,		125
Physical and Psychical Anthropology,	East Gallery,	129
Assyria, Germany and Ireland,	North Court	131
Collection of Idols and Other Religious Works,	2	133
Egyptian Antiquities,	3	133
Oceanica,	4	135
Asia,	5	137
Africa,	6	139
China,	7	141
Ethnology and Archaeology of America,	East Court	145
Aboriginal American Sculpture,	South Court	147
Eskimo,	10, 11	151
North Pacific Coast,	12, 13	155
Peru,	14	159
Peru and Colombia,	15	161
South America,	16	163
Paraguay,	17	165
Primitive Tribes of North America,	18	167
Department of Industrial Arts,		169
Section of Animal Industries,	22	170
Section of Fisheries Industries,	23	173
Section of Ceramic Industries,	30	177
Section of Textile Industries,	31	181
Section of Gems and Jewels,	32	187
Section of Miscellaneous Industries,	33	193
Section of Metal Working Industries,	76	195
Section of Transportation,	37, 38, 39, 40, 54 & 55	197
(a) Marine Transportation,	37	199
(b) Human Burthen-bearers,	38	203
(c) Pack Animals,	39	204
(d) Land Vehicles,	40, 55	205
(e) Steamboat Hall,	54	209
(f) Street (or Tram) Cars,	54	209
Department of the Rail Way,	46 to 53	211
Library,	29	239
Offices of the Museum,		242
Appendix,		243



PLAN OF ROTUNDA.



THE EXPOSITION MEMORIAL.

COLUMBIAN ROTUNDA.

The Rotunda of the main building of the Museum is devoted to an artistic memorial of Columbus and of the Columbian Exposition. The center-piece—the statue of the Great Discoverer with uplifted sword consecrating the New World—at once attracts attention both as an historical study and as a masterpiece of art. The original models of the figures and groups of figures ornamenting the main Exposition buildings, and donated by the Exposition to the Museum, occupy the entire space around the statue. These models are invaluable as works of modern art, representing the genius of the most talented sculptors of the present day.

In the contracts entered into with the various prominent sculptors they were called upon to furnish what are called "Sketches" of the sculptural decorations, i. e., the models were to be about one-sixth of the full size; from these models the Exposition's force of sculptors prepared full-size work by enlarging the "Sketches" six times. All the models were first submitted to the architects of the buildings for their approval, in order to harmonize the sculptural decorations with the architecture. The models here shown are the original "Sketches."

No. 1.—Columbus. By Augustus St. Gaudens. This imposing full size statue stood overlooking the Court of Honor at the main portal of the Administration Building. Translation of Latin inscription on pedestal:

"In late years the centuries will come
 "When the ocean will loose its fetters
 "And the vast earth will lie open,
 "And Tethis will disclose new countries,
 "When Thule will no longer be the remotest of lands."

No. 2.—Statue of the Republic. By Daniel C. French.

Nos. 3 to 38.—Statuary on Administration Building. By Karl Bitter, Sculptor.

- | | |
|------------------------|-----------------------|
| 3. Water Controlled. | 10. Air Uncontrolled. |
| 4. Water Uncontrolled. | 11. Goddess of Fire. |
| 5. Fire Controlled. | 12. Fisher Maiden. |
| 6. Fire Uncontrolled. | 13. Bather. |
| 7. Earth Controlled. | 14. Diana. |
| 8. Earth Uncontrolled. | 15. Air. |
| 9. Air Controlled. | 15. Harvest Girl. |

- | | |
|------------------|----------------|
| 17. Blacksmith. | 28. Diligence. |
| 18. Flower Girl. | 29. Joy. |
| 19. Patriotism. | 30. Unity. |
| 20. Tradition. | 31. Strength. |
| 21. Education. | 32. Peace. |
| 22. Truth. | 33. Religion. |
| 23. Strength. | 34. Industry. |
| 24. Liberty. | 35. Art. |
| 25. Charity. | 36. Commerce. |
| 26. Abundance. | 37. War. |
| 27. Theology. | 38. Justice. |

Nos. 39 to 45.—Sculpture Work on Agricultural Building
By Philip Martiny.

- | | |
|-------------------|------------------|
| 39. Four Nations. | 42. Horse Group. |
| 40. Four Seasons. | 43. Ceres. |
| 41. Cattle Group. | 44. Zodaic. |
| | 45. Victory. |

Nos. 46 to 51.—Figures of Inventors. Sculpture Work
on Machinery Hall. By Robert Kraus.

- | | |
|---------------|-----------------|
| 46. Galvane. | 49. Ericsson. |
| 47. Whitney. | 50. James Watt. |
| 48. Daguerre. | 51. Senfelder. |

Nos. 52 to 57.—Six figures on Machinery Hall. By M
A. Waagen.

- | | | |
|--------------|------------|--------------|
| 52. Science. | 54. Water. | 56. Air. |
| 53. Earth. | 55. Fire. | 57. Victory. |

Nos. 58 and 59.—Sculpture on Colonnade, by M. A. Waagen.

- | | |
|------------------|-------------------|
| 58. Horse Group. | 59. Cattle Group. |
|------------------|-------------------|

Nos. 60 and 61.—Electricity Building.

- | |
|---|
| 60. Electrification, by I. A. Blankinship. |
| 61. Experimental Electricity, by N. A. McNeill. |

No. 62.—Sculpture Work on Lagoons.

- | |
|---|
| 62. Lion at Base of Obelisk, by M. A. Waagen. |
|---|

Nos. 63 to 66.—Sculpture Work on Boat Landings. By
D. C. French and E. C. Potter.

- | | |
|-----------------------|-------------------------|
| 63. Industry (Horse). | 65. Wheat (Bull). |
| 64. Sloth (Horse). | 66. Indian Corn (Bull). |

Nos. 67 to 69.—Sculpture Work on Bridges of Lagoons.
By Edward Kemeys.

- | | |
|---------------------|---------------------|
| 67. Buffalo—Male. | 68. Buffalo—Female. |
| 69. The Still Hunt. | |

No. 70.—Glorification of Discovery. By Cratt.

THE COLUMBUS MEMORIAL.

The Columbus Memorial Museum consists of relics collected for the World's Columbian Exposition under the supervision of Mr. Wm. Elroy Curtis, of Washington, and sheltered for exhibition during the Exposition in the reproduction of the Monastery of La Rabida.

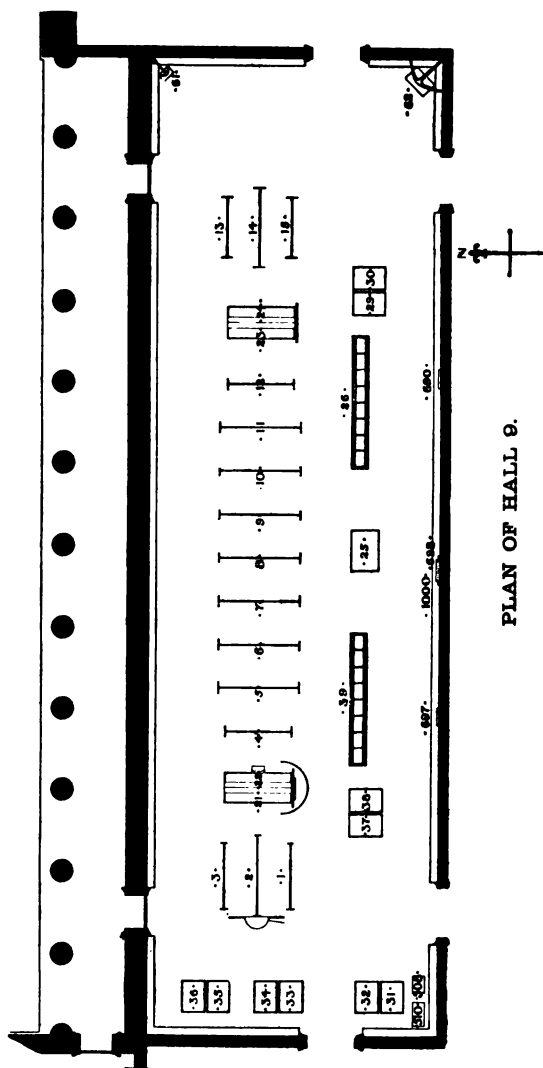
The collections comprise original manuscripts of Columbus and his time, and documents from the Vatican that first saw light in America during the Exposition; maps and charts, showing the earliest works of cartographers; books and pictures illustrating the growth and development of geographical knowledge; portraits and busts, showing the different conceptions regarding the appearance of Columbus in life; monuments, inscriptions, tablets, referring to his remains; nothing has been omitted that would throw light upon the career and personality of the discoverer of America.

Every picture is here with a purpose; every map, chart, relic is a link in the chain connecting the history of the New World with the Old. The student, the historian, the antiquarian, will find in them material for months of study.

To the student of art, Hall 1, with its fine specimens of Byzantine, Mosaic and modern art, will be especially interesting. The rest of the pictures in this department although mechanical, are interesting in connection with what they represent.

In Hall 9 the whole career of Columbus is fully represented. Here the interested visitor may read the story of the life and work of Columbus—his struggles to gain the confidence and support of the Spanish sovereigns; his apparent failure and ultimate success, his preparation for the voyage; his departure and his triumphant home-coming. These, together with his later discoveries and the sad scenes associated with his last days, are to be seen in the order of their sequence.

The three rooms situated in the northeast corner of the main building of the Museum Halls 1, 8, and 9 are devoted to this collection. Entering from the East Court, and passing through to the center and largest room of the three, the visitor will do well to inspect, first:



PLAN OF HALL 9.

HALL 1.

Cases 40 and 41.—The objects of art and famous historical documents in this hall are mainly from the Vatican, Rome, and have recently been donated to this Museum by His Holiness Pope Leo XIII.

No. 654.—Album containing specimens of ancient writings from records of the Roman Pontiff, from Innocent III. to Urban V.

No. 655.—Facsimile in phototype of the Vatican Greek Bible.

No. 662.—Aquarelles, or water-colors, representing paintings in the Roman Catacombs.

No. 656.—The Codex of the Prophets, and several other valuable books.

No. 653.—Album containing reproductions of documents relating to the early history of America, taken from the famous series of Papal Registers in the secret archives of the Vatican Palace. The facsimiles of documents relating to the early history of America, here exhibited, are taken from the famous series of the Papal Registers, or letter books. These are a collection of more than 12,000 volumes in folio, written partly on parchment and partly on paper, and are preserved in the secret archives of the Holy See of the Vatican Palace.

Since 1879, by order of Leo XIII., these archives have been open, and their treasures accessible to the students of history and investigators from all countries and of all religions.

In these registers almost all the letters issued by the Popes were recorded before being sent to their destinations. They contain, also, the petitions received, and therefore offer original and most important materials for the histories of all nations.

The papers of which facsimiles are here shown, may be divided into four groups, viz.:

Those which relate to the Bishopric of Gardar, in Greenland;
Those which relate to the line of demarcation;

Those which relate to the sending of missionaries to America; and

Those in which Pope Julius II. recommends Bartholomew and Diego Columbus. (See also Case 39 in Hall 9.)

The five Mosaics, from museum of the Vatican, on the walls of this hall, are exceedingly fine specimens of the Mosaic art.

No. 649.—"The Prophet Isaiah."

After the original fresco painted by Raphael in the Church of St. Augustine. It preserves a precious work of the immortal artist, which, from its situation and the force of circumstances, is destined to perish. Its execution required sixteen years' labor.

No. 650.—"The Roman Forum."

After the original painting by Angelini, showing the remains of these grand monuments (Roman) as they existed before the restorations of the last twenty years.

No. 651.—"Theology."

After the original painting by Raphael.

No. 652.—Picture in Musaico Filato.

After original painting from the actual, representing the facade and colonnade of St. Peter's and the Vatican Palace, when the Pope, from the loggia, blessed the people.

No. 663.—"St. Peter Weeping."

Half-figure after the original painting, by Guido Reni.

This is considered a masterpiece; the finest Mosaic in the world. Its execution required six years' labor.

The collection of Byzantine Madonnas, hanging in this hall, of which a full description will be found in the catalogue, were painted from the XII. to the XVI. centuries, and are very valuable.

No. 645.—Portrait of Sovereign Pontiff Alexander VI. gazing in adoration toward Jerusalem. Reproduced from the original fresco by Pinturecchio, 1494, in the Appartamento Borgia at the Vatican.

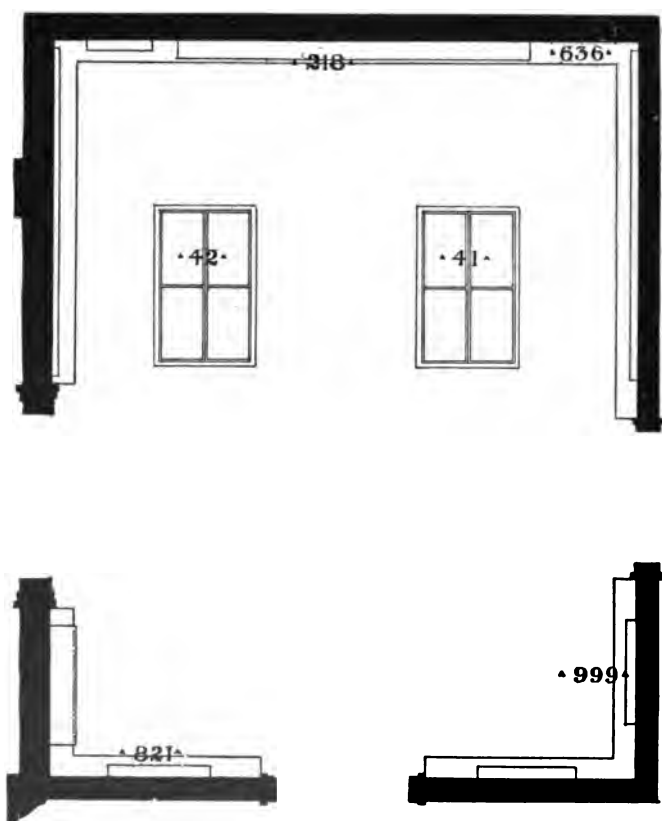
No. 422.—Portrait of Bartholomew de las Casas.

The most famous of the historians of the time of Columbus was Friar Bartholomew de las Casas, who was born in 1474, died in 1566, and wrote the "Historia General de las Indias," in three

volumes, which has never been published, but manuscript copies are to be found in the Lennox Library, New York, the Congressional Library at Washington, and the library at Harvard College. The father of Las Casas accompanied Columbus in 1492, and his narrative of that expedition was an abstract of the log book kept by the Admiral during the voyage. Columbus also entrusted to him most of his papers. A translation of this narrative was published in English by Samuel Kettele, of Boston, in 1827.

No. 525.—Don Juan Marcelo Chequanthopa, descendant of the Incas of Peru, Governor of San Geronimo, 1684.

No. 164.—The 12th of October, 1492, by Piedro Gabrini, of Rome.



PLAN OF HALL 1.



HALL 9.

Screens 1 and 2.—Pictures, maps, and charts relating to the geographical knowledge, and the science of navigation at the time of Columbus.

Screen 3.—Is a continuation with additional pictures relating to the Court of Ferdinand and Isabella. On the walls of this hall, commencing at the northwest corner, and following around the room, things relating to, and scenes associated with, the early life of Columbus, his career in Spain, his voyages, discoveries, triumphant return, his last days, and his death are to be found.

In connection with the above, attention should be given to

Cases 21 and 22.—The doors and shutters of the house occupied by Columbus at Porto Santo, Madeira Islands.

Case 23.—Replica of the doors that guard the cell in which are held the alleged remains of Columbus, in the Cathedral of Santo Domingo.

No. 252.—Facsimile of a cross erected by Columbus in 1494 after a victory over the Indians, made from the beams of the castle in which Columbus was confined.

Case 24.—Original door and jamb from the monastery of La Rabida, near Palos, Spain.

No. 61.—The anchor of Columbus is in the northeast corner of the room.

No. 62.—Sixteenth century anchor; ancient *añchor* extremely old type, which had laid in the mud on the east bank of the Ozama river for centuries, and, according to tradition was the property of Don Diego Colon.

Case 25.—Facsimiles of the Casket and Lead Case in which the alleged remains of Columbus are contained. Key to the house at Porto Santo, Madeira Islands, where Columbus lived shortly after his marriage. Bricks and tiles from the original Monastery of La Rabida, near Palos, Spain. Some of them are supposed to be sixteen centuries old.

Case 26.—Various articles of interest from the first settlements founded by Columbus. No. 614,—Original and modern reprint of the Guiliiano Dati poem. On the 25th of October, 1493, there was printed at Florence, a metrical translation of the *Sant-*

angel letter. The author was Guiliano Dati, Bishop of Saint Leone, born at Florence in 1445, and the author of several poems, which are among the rarest of bibliographical curiosities.

On a large pedestal (51), in the next hall beyond Hall 8, will be found one of the guns planted near the palace of Diego Columbus at Santo Domingo in the year 1509, being one of the largest guns that could be procured at that time, and placed there to destroy the palace at the first sign of insubordination on the part of Diego Columbus by the council sent over to restrain any attempt that might be made to establish an independent government. On pedestal (52) is a pile of stone, brick and tiles which represents all that remains of the town of Isabella, the first civilized settlement of the New World founded by Columbus on his second voyage in 1493.

Returning to the main hall (Hall 9),

Screens Nos. 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 should now be inspected in the order given. Here will be found facsimiles of letters written by Columbus, pictures, maps and charts relating to the publication of the discovery, the christening of the continent, the conquest of Mexico and Peru, and the settlement of other portions of America.

Cases 29 and 30.—Rare books in connection with the above. No. 417—First Biography of Columbus ever published. No. 415—The first published portrait of Columbus. No. 419—One of the first books published concerning the West Indies. No. 418—Life of Columbus, by his son, Fernando. No. 421—The 1511 edition of Ptolemy. No. 414—The book of Philopono; a curious description of the new world by a Benedictine monk. No. 405—Facsimile of the letter of Columbus to Rafael Sanchez. No. 416—Manuscript copy, in Latin, of Ptolemy's *Cosmographiæ*, 1504. No. 504—Illustrated Spanish Missal of the 15th century, from a Franciscan convent in the interior of Peru.

No. 441.—Also on the South wall. Portraits of Gautrin Lud, founder of the Gymnase Vosgien, which christened America.

No. 448.—Portrait of Jean Basin of Sandaucourt, the second member of the Gymnase.

No. 447.—Portrait of Matthias Ringman, Member of the Gymnase Vosgien, who carried the letter of Americus Vespucius, which, when translated, christened the New World.

No. 510.—Copy of the Borgian map of the World, made by Diego Ribero in 1529.

A beautiful and complete map of the Old and New World.

It was divided into two parts, in conformity with the terms of the compact between the Sovereigns of Spain and the King of Portugal at Tordesillas in 1494. On either side of the line of demarcation are the banners of Spain and Portugal reaching America on the coast of Brazil.

Case 33.—No. 1—The commission of Columbus as Viceroy and Governor General of the Indies, considered the most precious historical document in existence; original in the possession of the Duke of Veragua. No. 2—Certified copy of instructions given to Columbus by the catholic kings for the voyage to be made by him to the Indies. No. 3—Certified copy of agreement between catholic kings and Columbus, April 17, 1492. No. 4—Grant of a coat of arms to Columbus by the catholic kings. No. 5—Confirmation of the title of Admiral and Perpetual Viceroy of the Indies given to Columbus. No. 6—Original grant of ten thousand maravedis per year made to Columbus by the catholic kings.

Cases 31, 32, 33, 34, 35, 36, 37, and 38.—Photographs of the original papers and documents relating to Columbus, owned by the Duke of Veragua and the Duchess of Berwick and Alba.

Case 39.—A part of the Vatican exhibit, and contains facsimile of documents relating to the early history of America taken from the famous series of papal registers which are preserved in the secret archives of the Holy See at the Vatican Palace. The rest of the Vatican exhibit is to be seen in the adjoining smaller room to the west, and consists of valuable historical documents and objects of art in the archives of the Vatican, donated by His Holiness Pope Leo XIII.



HALL 8.

Screens 16 and 17.—Early pictures of America from De Bry's voyages, and from *Description de L' Univers*, by Allain Manesson Mallet, Paris, 1633; also other pictures of scenes associated with the voyages of Columbus, for which room could not be found in Hall 9.

Northeast Wall.—Portraits of descendants and the genealogy of Columbus.

Stands Nos. 51 and 52.—The large cannon and pile of stones already referred to in connection with Hall 9.

No. 857.—Buccaneer cannons from Tortola, West Indies. These cannons are supposed to have come from one of the pirate ships landed here in the 17th century.

Case 42.—Articles of historical interest from Costa Rica and the West Indies.

Case 45.—Collection made by George F. Kunz of Columbus and World's Columbian Exposition Medals, Medallions, Jetons, etc., consisting of over 200, among them the Milan, the Tiffany, Numismatic and Archæological Society, the Genoa, and various medals struck by governments, states, dealers, etc., in connection with the World Columbian Exposition and the Columbian year.

South Wall.—Portraits of Columbus.

The several pictures which are intended to represent the real or ideal Columbus may be grouped into four classes, as follows:

1. Those of Giovio type—either copies of the portrait which hung in the gallery of the Archbishop of Como, or drawn from verbal descriptions given of the Admiral by his contemporaries.

2. The De Bry type, representing Columbus as a Dutchman.

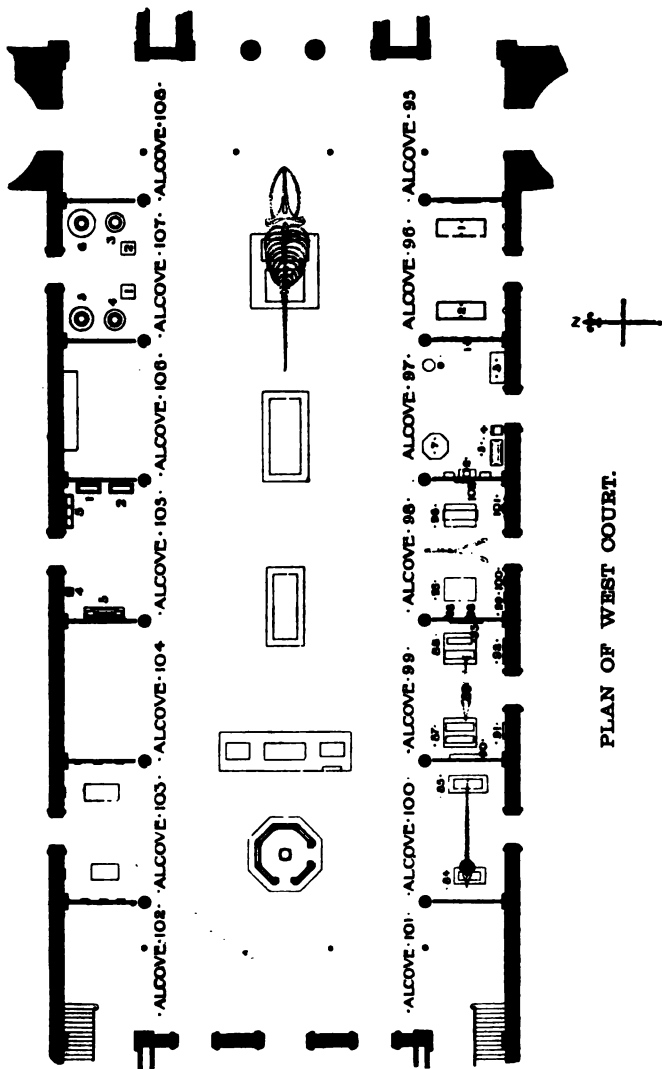
3. The portraits with beards and costumes of the century subsequent to his death.

4. The fanciful pictures without pretense to authenticity.

North Wall. The monuments of Columbus.

There are twenty-nine statues and monuments to Columbus in America, six in Spain, seven in Italy.

No. 363.—Dug-out. Type of boat used by natives.



PLAN OF WEST COURT.

THE WEST COURT.

The large objects in the West Court form a part of the Natural History collections.

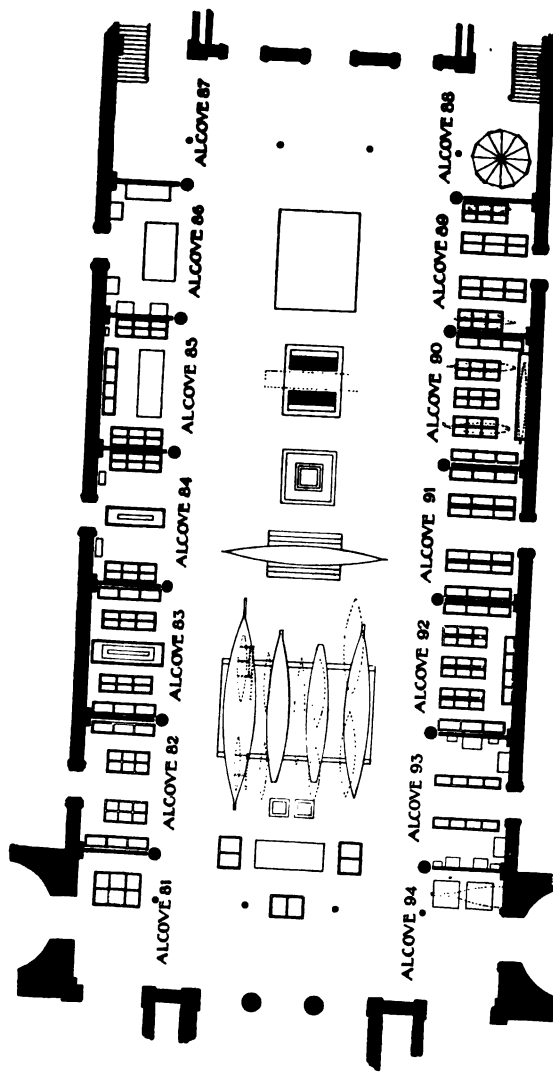
The arrangement is intended to typify to some extent the beginnings and development of vegetable and animal life upon our planet.

The series begins near the west door with the terra cotta pavilion, composed entirely of earth, and containing a vase of the same material in which low forms of vegetation, Lichens and Mosses, are growing.

Next to it, emblematic of forest growth, stands a section of an immense California Redwood Tree, 878 years old, and nearly fifteen feet in diameter, which was 69 inches in thickness when Columbus discovered America, 1492. Upon either side of it stand two sections, one of Western Spruce, seven feet in diameter, and the other of Oak which illustrates chronologically, the comparative rapidity of ring growth in trees; while upon the four corners of the dais are installed living specimens of four principal forms of tree life.

Following in order are the skeleton of the Mastodon, from America, and the reproduction of the huge Mammoth, sixteen feet high, found in Siberia, and the skeleton of a whale; these exemplify land and marine animal life.

Two large rocks, grooved and polished by glacial action and belonging to the Geological Collection will be found under the skeleton of the whale.



PLAN OF EAST COURT.

THE EAST COURT.

Separated from the West Court by the Columbian Rotunda, a memorial of the greatest of expositions, is a series arranged to show human progress during four centuries.

A plaster group, representing an Indian armed with primitive bow and arrow, killing the buffalo upon the prairie, stands next to the rotunda.

A fine series of representative primitive boats, the earliest appliances for inter-communication, come next, while close by is a gondola of the most modern type, of fine design and luxurious furnishing, ready for service, manned by two gondoliers in gay apparel.

Next on the east is the figure of Vulcan, of hammered copper, and of heroic size, which stands upon a pedestal composed of sections of iron beams artistically arranged, typifying man's strength and skill in utilizing the products of the mineral kingdom.

The modern methods of transmitting great power at high speeds, is represented by the immense wooden pulley, 18 feet in diameter, the largest of its kind, flanked by a large steel gear wheel.

Full size models of the locomotives of Trevithick and Stephenson, whose names will ever be associated with the invention of the locomotive, stand near the east door. They illustrate man's conquest over the elements in our century, by applying the generated forces to inanimate matter, and complete the series.

THE NORTH COURT.

In the North Court stands the handsome model of the Reichstag (the German Parliament house), presented by the Imperial German Commission. This model, which is one of the handsomest of its kind, and complete in every detail of architecture and sculpture, is 19 feet wide by 21 feet long, and stands 9 feet high. It recalls the magnificent exhibit made by the German government at the Exposition. The alcoves on the East side are occupied by Anthropological exhibits, including chiefly antiquities from Ireland and Assyria.

THE SOUTH COURT.

In the South Court are installed full-sized reproductions of antiquities from Yucatan and Central America, more fully described under the Department of Anthropology, page 127.

DEPARTMENT OF GEOLOGY.

The collections gathered in the Department of Geology are designed to illustrate the history of the earth's development and the materials which form its crust.

Since, moreover, the science of geology has both a theoretical and a practical side, a division of the collections has been made in order to present these two phases of the subject. Those illustrating geology as a theoretical science are to be found in the Division of Systematic Geology; those showing it in its relations to human arts and industries, in the Division of Economic Geology.

DIVISION OF SYSTEMATIC GEOLOGY.

This division comprises six sections, located as follows:

Paleontology: Alcove 103, Halls 35, 36 and 59.

Geographic Geology: Halls 60 and 61.

Meteorites: Hall 62.

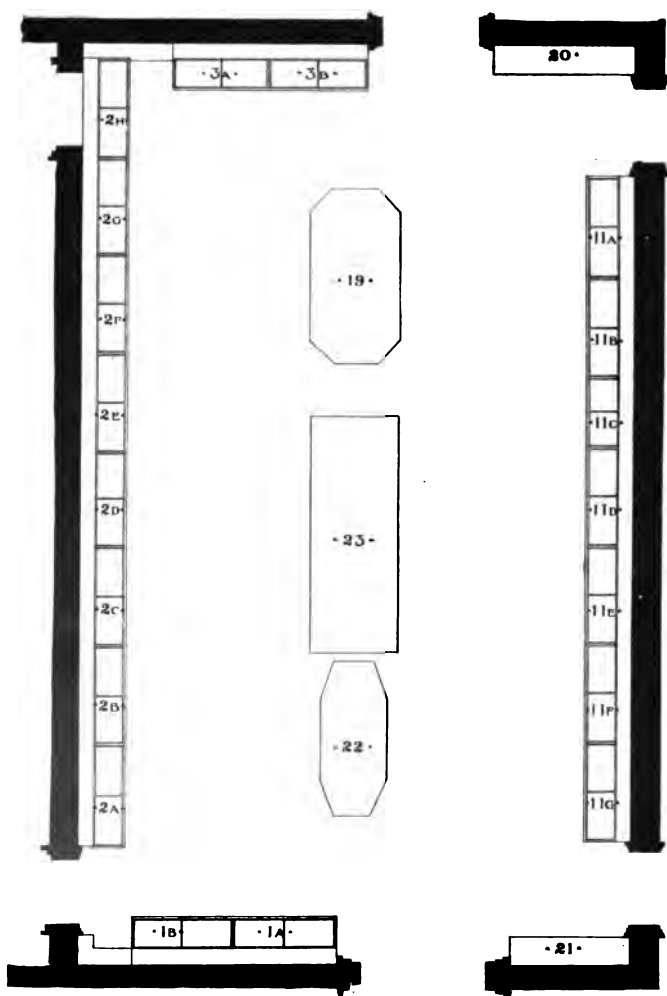
Systematic Mineralogy: Halls 63 and 64.

Structural and Dynamical Geology: Hall 65.

Lithology: Hall 66.

These sections illustrate in order, first, the life of the globe from its earliest beginnings to its latest and highest forms; second, the configuration and mode of formation of the surface of the earth; third, the bodies which come to us from regions outside the earth and which furnish the only material sources from which we can learn the composition and structure of the heavenly bodies; fourth, the component minerals of the earth's crust, classified according to their chemical composition; fifth, the aggregates of these into rocks, and sixth, the effects produced by physical forces in forming and shaping the materials of the crust.

The arrangement of specimens under each section follows that of some standard text-book on the subject, so that each section may be considered as illustrative of such text-books, or on the other hand these may be referred to for a fuller description of the specimens or discussions of the subjects presented.



PLAN OF HALL 35.



HALLS 35, 36, AND 59. ALCOVE 103.**PALEONTOLOGY.**

The section of Paleontology seeks to illustrate by fossils, casts, and models, the animal and vegetable forms which have characterized the life of the globe at the succeeding stages of its history. The arrangement is primarily chronological, and secondarily zoological, and the order to be followed in a study of the collection is indicated by the numbering of the cases. Passing from left to right as one would do in reading a book, the collection may not improperly be regarded as a book describing the history of the earth from the dawn of life to the present time, though the characters in which it is written are rock specimens instead of printed letters. The series begins in Hall 35, at the left of the entrance from the West Court, passes along the west wall, the south wall of Halls 36 and 59, then to the other side of the same rooms, and back to the right of the entrance to Hall 35. The larger specimens in the center of the halls it was impracticable to place in chronological order, but the specimen labels show the period to which each belongs. All the specimen labels show: 1st, the name of the species, together with that of the authority by whom named; 2nd, the geological period or epoch to which each belongs; and 3rd, the locality. Wherever a cast is shown, the fact is indicated by the label, so that it may not be confounded with actual specimens.

Under each period the specimens will be found arranged in accordance with their zoological rank, beginning with the lowest. Plants are placed first, then in order, Protozoans, Radiates, Mollusks, Articulates and Vertebrates.

The visitor will find it interesting to note the characteristic forms of life of the different epochs, and the increase in number and variety of species as the earth's history advanced.

Alcove 103.—Here are shown characteristic fossils of various periods, including restorations of *Ichthyosaurus* and *Plesiosaurus* which were large marine reptiles of the Jurassic period; two large specimens of *Arietites*, a mollusk allied to the modern Nautilus; tracks of reptiles of the Triassic age, on sandstone from Turner's Falls, Mass.; fossil fishes of the Tertiary period from the Green River, Wyoming, beds; corals, crinoids and echinoderms of the Carboniferous age, etc.

There will also be found here a collection of local fossils, gathered from the Niagara beds of Northern Illinois.

Case 1A, Hall 35.—Fossils of the Laurentian period. The only fossil illustrating this period is the problematic *Eozoön Canadense*, several specimens of which are shown. It is thought by some to represent the fossil remains of a gigantic Rhizopod, but is generally considered to be of wholly inorganic origin.

The remainder of Case 1 and Cases 2A.-F.—Fossils of the Silurian age or age of Invertebrates. The life of this age is almost wholly marine and made up chiefly of corals, crinoids, brachiopods and mollusks. It is illustrated in the collection according to periods as follows:

Case 1A and B.—Cambrian and early Silurian fossils. *Oldhamia*—probably a plant of the order of marine algae. *Brachiospongia*—a representative of the class of sponges. *Monticulipora*—of Corals.

Diplograptus, *Tetragraptus*—Hydroids known as graptolites—abundant fossils of this era. The name is derived from the Greek word meaning "to write" and refers to the plume-like nature of their remains. *Scolithus*—supposed to represent the borings and tracks of worms.

Tentaculites—minute mollusks of the class of Pteropods. *Conularia*—perhaps also Pteropods.

Paradoxides, *Asaphus*, *Olenellus*, *Agnostus*—Trilobites, the most common and characteristic fossils of early Silurian times. They were crustaceans, allied to the horse-shoe or king crabs of the present day. Two models illustrate the various parts of their structure, and tracks of a trilobite, genus *Climacichnites*, are shown on a large slab of sandstone from Wisconsin. The number of great animal types having existence in even the earliest geological periods is worthy of note.

Between Cases 1 and 2, a cast of an *Orthoceras*, nine feet in length. This shows the size which these Cephalopods, represented at the present time by the Nautilus, attained in early times. They were a striking feature of the Palæozoic era.

Case 2A.—Trenton and Cincinnati epochs. *Receptaculites*, *Selenoides*—probably calcareous sponges. *Favistella*—Corals belonging to the family Favositidae or honey-comb corals, so called

because made up of hexagonal parallel columns. *Orthis*—a genus of the class of Brachiopods, characteristic of this epoch.

Brachiopods are sometimes called lamp shells, on account of their resemblance to a Roman lamp; the two valves of the shell are unequal in size, and the beak of the larger curls over on that of the smaller. Though found only in small numbers at the present day, they were in Silurian times the most abundant and characteristic form of marine life. In structure they have points of alliance with the Worms on the one hand and with Mollusks on the other. *Pleurolomaria*, *Murchisonia*—Gasteropod or univalve Mollusks common in the Trenton epoch.

Case 2B.—Hudson River and Medina epochs. Brachiopods are represented by large slabs containing *Leptoena*, also many species of *Lingulella*, *Lingula* and *Rhynchonella*. Species of the two latter genera exist at the present day and may be seen in Hall 25, Department of Zoology. They afford a remarkable example of the power of a genus to survive the vicissitudes of time. *Glyptocrinus*, *Iocrinus*.—Crinoids, the class of Echinoderms most abundant in early times. Attached by a jointed stem and bearing many branching arms, they have been appropriately termed sea-lilies.

Arthrophyucus—supposed to represent the leathery stems of seaweeds. Some authorities, however, regard this fossil as representing the markings of worms.

Case 2C.—Hudson River and Niagara epochs. *Eridophyllum*.—Corals of the Cyathophylloidea or cup-coral family. *Halysites*.—Corals of the Halysitidae or chain-coral family. Nearly all Silurian corals belong to these two or the Favositid family.

Streptorhynchus.—A representative Brachiopod. *Orthoceras*—many specimens illustrating the size and distribution of this Silurian Cephalopod. Above Case D is a drawing showing how the animal lived in its shell. It occupied only the outer chamber, but was connected with the other sections by a large siphuncle.

Cases 2D and E.—Niagara and Lower Helderberg periods. *Favosites*, *Halysites*—Corals. *Eucalyptocrinus*—Crinoids. *Illænus*—Trilobites. *Bythotrephes*—probably marine algæ. *Pentamerus*—a large and abundant Brachiopod, characteristic of the Niagara beds of the Mississippi Basin. *Spirifer*, *Rhynchonella*—other common Brachiopods. *Eurypterus*—a large number of specimens

from the Water Lime group of New York. These are Crustaceans of the order of Entomostraca, having their nearest modern representative in Cyclops, a microscopic fresh water animal.

Case 2F.—Foreign Silurian fossils. From the Wenlock limestone of England, several specimens of *Periechocrinus*, a large and beautiful Crinoid, *Cyathophyllum*, a Cup coral, and others. From the Bohemian beds, several species of Graptolites, the genera *Phacops* and *Dalmanites* among Trilobites, and many specimens of the *Orthoceras* family, including *Phragmoceras* and *Gomphoceras*.

Cases 2G, H and 3.—Fossils of the Devonian age or age of fishes. The fishes which by their size and abundance characterized this age, belonged to two orders—Ganoids, represented at the present day by the gar-fish and sturgeon, and Placoids, the order which includes sharks, skates and rays. They differed in many respects from the fishes of the present day however, the Ganoids being covered with thick, bony scales, having teeth of reptilian characters and jointed, paired fins. The Placoids had cartilaginous skeletons, no scales, no gill covers, and other embryonic characters.

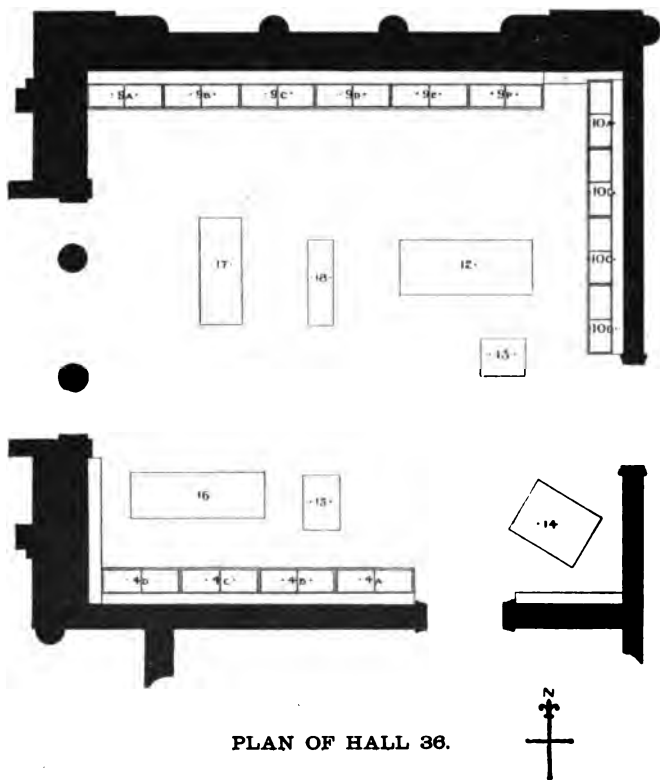
Case 2 G.—Lower Devonian fossils of the Corniferous period. *Favosites*—Honey-comb corals. *Heliophyllum*—Cup corals.

Ophiura, *Loriolaster*—Asteroids similar to modern starfishes. Being free moving Echinoderms, they mark the introduction of a higher type than the attached Crinoids. *Macropetalichthys*—a Ganoid fish.

Case 2 H.—Lower Devonian fossils. *Syringopora*—Chain corals. *Zaphrentis*—common and characteristic cup corals. *Orthis*, *Atrypa*, *Spirifer*—Brachiopods. *Coccosteus*—a typical Ganoid from the Old Red Sandstone of Scotland.

Case 3A.—Middle Devonian fossils. *Psilophyton*—one of the earliest of land plants. It belongs to the group of Lycopods or club-mosses. *Holoptychius*, *Glyptolepis*, *Diplopterus*—Fishes from the Old Red Sandstone of Scotland. These are nearly all Ganoids, as may be seen from the large, bony scales with which they are covered. *Cyathophyllum*, *Cystiphyllum*, *Zaphrentis*—Cup corals.

Case 3B.—Upper Devonian fossils. Large, polished masses of *Acerularia* from Iowa, a honey-comb coral. *Dictyophyton*—large masses from New York, belongs to the class of sponges. *Aspidosoma*, *Furcaster*—Asteroids. *Spirifer*, *Orthis*—Brachio-



PLAN OF HALL 36.

Pods. *Goniatites*—represent the Cephalopods. They are of the same type as *Orthoceras*, but are coiled and the junction of the septa and shell (suture) is zigzag instead of straight. *Bothriolepis*—Ganoid fish. Note the thick, bony plates or armor.

Cases 4A, 4B, 4C, 4D, and 5A.—Fossils of the Carboniferous Age, or age of coal plants. Naturally land plants are the striking features of this age. They belong to five great families: Conifers, Ferns, *Lepidodendrids*, *Sigillarids*, and *Calamites*.

Cases 4A, 4B, 4C, 4D, Hall 36.—*Cordaite*s. This tree is allied to the Conifers, and had probably a straight trunk 60 or 70 feet in height. *Trigonocarpum*, in the same case, is supposed to represent its fruit. Ferns are represented by *Pecopteris*, *Neuropteris* and others, many imprints of sections of the fronds being shown. These frequently form the center of clay concretions, as may be seen in some which have been broken open. Sections of trunks of *Lepidodendrids* and *Sigillarids*. One of the latter shows by its size that the trunk of the original tree must have been many feet in diameter, and perhaps 80 to 100 feet high. *Stigmaria*, probably represent the under-water stems of the *Sigillarids*.

The animal life of this period is characterized by the abundance of Crinoids, as they reached their highest development at this time. Many specimens are shown in this case, including *Platycrinus*, *Scaphycrinus*, and *Pentremites*, a Blastid or bud Crinoid. Corals were also abundant, as represented by the columnar *Lithostrotion*, a true polyp coral, and *Dibunophyllum*, some polished slabs containing which are shown. The cork-screw like Bryozoan *Archimedes* is illustrated by several specimens. *Sprifera* and *Productus* are the leading genera among the Brachiopods. The Gasteropods, univalve mollusks, are represented by *Bellerophon* and *Pleurotomaria*. *Melonites*, in the upper part of Case 4, was an Echinoid allied to the sea urchin of the present day; they differ from the latter, however, in having large plates and small spines. The cast on the wall shows the foot-prints of one of the first reptiles, *Sauropus*. This was a four-footed, crawling animal, with thick, fleshy feet about 4 inches long.

Case 5A, Hall 59.—Permian, or closing age of the Carboniferous. Fishes are represented by the *Palæoniscus*. Reptiles by the *Archegosaurus*, an animal which combined the characters of reptile and fish, having both lungs and gills, and being covered

with scales. Plants are represented by leaves of the *Walchia*, a Lycopod. The fossils of the Carboniferous Age are especially numerous in the State of Illinois, and a good description of them can be obtained from the report of the Geological Survey of Illinois, Volume II, which may be found in the Library.

South and West Walls of Hall 36.—Large slabs and casts showing tracks of reptiles of the Triassic period. Little is known about these animals, except so much as can be learned from their foot-prints. The *Brontosomus* was a three-toed animal, probably at least 14 feet in height, and had a stride of over 3 feet. *Cheirotherium* (South Wall, Hall 59) was so named from the resemblance of the foot-print to the human hand. It was a four- or five-toed reptile, probably of the order of the Labyrinthodonts. A cast showing the shape of the skull of the latter animal may be seen at the right.

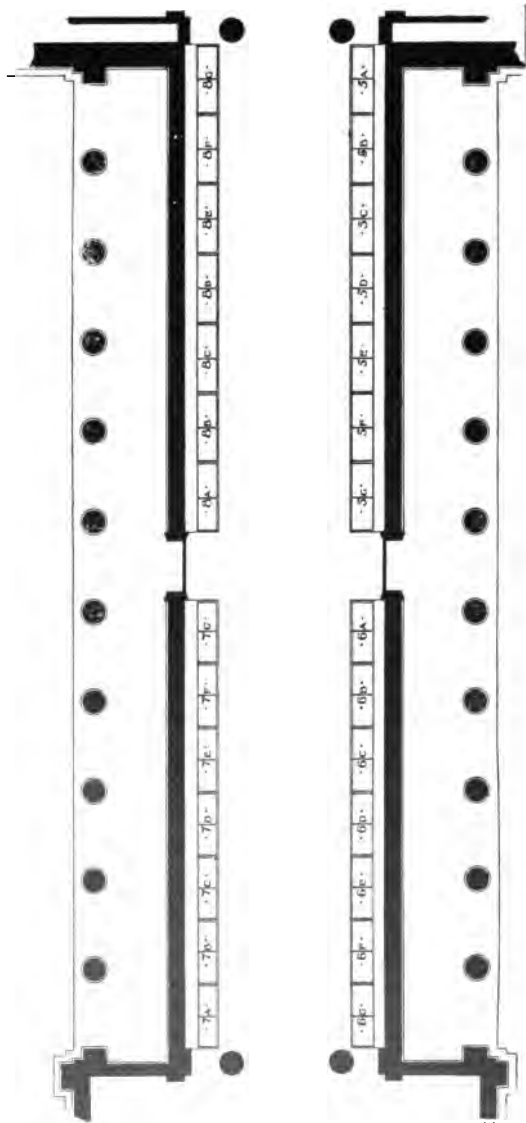
Cases 5, 6, 7, part of 8, and Walls of Hall 59.—Fossils of Mesozoic Time, the age of reptiles. This age is characterized by the number and size of its reptiles, especially Amphibians. Here, too, are introduced the first mammals, birds, and fishes of the modern type, and among plants the *angiosperms*.

Cases 5A and B.—Triassic fossils. Many of the types of the Carboniferous age continue to be prominent. *Equisetum*, belonging to the family of Equisetæ, or "Horsetails" of the present day, and *Pterophyllum*, of the order of Cycads, were most prominent among the land plants, and are illustrated by many specimens. Among the Lamellibranchs, the modern genus of *Modiola* is introduced. *Ceratites* represents the Orthoceras of early times, from which it will be seen to differ in being coiled, and in having a more complex suture.

Cases 5C, D, E, F, G, 6, 7, 8A, B, C, D, and Walls of Hall 59.—Jurassic fossils.

This is the period when the class of reptiles reached its greatest development. Other interesting fossils are found, however.

Cases 5D, E, F, G.—Among plants, Cycads are illustrated by several specimens of *Cycadoidea*. Conifers and Ferns are also shown. Among Invertebrates the beautiful Crinoid *Pentacrinus*, three specimens on the south wall, is especially notable. Other Echinoderms are *Cidaris*, *Hemicidaris*, *Pygaster* and *Clypeaster*, the two latter being allied to *Clypeus* or "sand dollar" of the present day.



PLAN OF HALL 59.

Brachiopods, mostly of the sloping shoulder type, illustrated by the genera *Terebratula* and *Rhynchonella*. Among bivalve mollusks the modern genus of *Ostrea*, or oyster.

Imprints of Insects on the lithographic slates. These lithographic slate beds afford a large number of beautifully preserved specimens, as this stone is especially adapted for such preservation. Other Articulates, of the class of Crustaceans, from the same beds, *Limulus*, *Eger*.

Case 6.—Ammonites, remarkable for size and complexity of suture. Many specimens are shown, including the genera *Cardioceras*, *Arietites*, *Grammoceras*. Some of the *Arietites* are 3 feet in diameter. The sutures of some specimens have been painted to bring out the markings. Many specimens of *Nautilus* and allied Cephalopods.

Case 7.—*Belemnites*. These are allied to modern Cuttle-fish and Squids. The only part of the animal usually preserved is the internal bone, or pen. Two restorations of the original animal are shown.

Ichthyosaur, *Plesiosaur*, and *Pliosaur*. These are great marine reptiles, whose remains are common among the rocks of this period. They are here illustrated by a large number of specimens and casts. Restorations of the first two may be seen in the Alcove at the entrance of Hall 35. A complete head of an *Ichthyosaur* from England is placed between Cases 5 and 6. The animal was sometimes 30 to 40 feet in length, and had enormous eyes—sometimes 15 inches in diameter. The vertebrae were concave and fish like, and the animal combined many characteristics of the fish and reptile. The *Pliosaur* was an animal of the same type, even larger than the *Ichthyosaur*.

Cases 8A, B, C, D.—The *Dinosaurs*, or land reptiles, are illustrated by bones and vertebrae of the *Teleosaur* and casts showing various parts of the *Megalosaur*. *Pterosaurs*, or flying reptiles, are illustrated by imprints of wings of the *Rhamphorhynchus*, an animal not unlike the bat in appearance, and by casts of the remains of *Pterodactyls*.

Cases 8E, F, G, and 9.—Fossils of the Cretaceous period.

Case 8E.—Here we find the first of modern plants, or *Angiosperms*. Imprints of leaves are shown, many being modern genera, such as *Sassafras*, *Populites*, or poplar, *Betulites*, or birch and *Viburnum*.

Cases 8F and G.—Among bivalve mollusks the order of *Rudistes* is unique, and characteristic of this period. In shells of this order one valve is enormously enlarged, and somewhat funnel shaped; the other valve is small and acts as a lid—*Hippurites*, *Sphærulites*, *Radiolites*. *Inoceramus* also belongs to this order, and sometimes reaches enormous size.

Casts, much enlarged from the original, illustrating the forms of *Foraminifera* whose shells make up the vast deposits of chalk which characterize this period.

Along with these deposits are flint nodules formed from the siliceous spicules of sponges, and many fossil sponges are preserved—*Siphonia*, *Cyclolites*.

West Wall of Hall 36.—*Ventriculites* are enormous sponges of this period.

Case 9, Hall 36.—Among Echinoids, the free moving forms are vastly in excess of the stemmed—*Holaster*, *Toxaster*, and *Ananchytes*. Among Cephalopods are specimens of *Nautilus* of modern type; also members of the *Ammonite* family, which take on various and intricate forms. All grades of shape are found, from the straight-shelled to those of hook-shape, partly uncoiled spirals, spirals, etc. The genera are named from their characteristic forms, some of them being as follows: *Baculites*, rod-shaped, one specimen 3 ft. long, West wall of Hall 36; small *Baculites*; *Hamites*, hook-shaped; *Helicoceras*, an open spiral; *Macroscaphites*, boat-shaped; *Turritiles*, tower-shaped.

Agassiz describes these forms as representing the death contortions of this remarkable family. The term is an appropriate one, since with this age they become extinct.

Lamellibranchs and *Gasteropods*, illustrated by many specimens, mostly of modern types—*Ostrea*, or oyster, of many and curious shapes, *Pecten*, *Vola*, *Exogyra*, *Gryphaea*, etc.

North Wall of Hall 36.—Cast of head of *Mosasaurus*, the sea serpent of ancient times. This was a swimming, snake-like reptile, probably 80 feet in length. Its vertebrae are illustrated by a cast, Case 9E.

Cases 9F, 10 and 11.—Fossils of Cenozoic time, or age of mammals, divided into the Tertiary and Quaternary periods.

Cases 9F, 10 and 11A and B.—Tertiary fossils.

Case 9F.—*Flabellaria*, leaves of a palm which grew in the Eocene epoch near Green River, Wyoming. Also, leaves of *Acer*, or maple, and other modern plants.

Nummulites—These are abundant and characteristic fossils of this period. They are shells of a Rhizopod, and in Europe and Africa form limestones many thousand feet in thickness.

Case 10.—Among univalve mollusks many modern types will be recognized—*Turritella*, *Natica*, *Cerithium*, *Strombus*, and others.

Fishes belonging to the order of *Teleosts*, or osseous fishes, are illustrated by many specimens from the Green River beds—*Priscarrara*, *Diplomystus*, etc. These are of modern types and related to the perch, herring and the like.

Sharks of enormous size also existed. Teeth of the *Carcharodon* are common fossils, and specimens may be seen in this case.

Floor of Hall 36, Pedestal 13.—A restoration showing the jaws of *Carcharodon* and within these, for comparison, the jaws of a modern shark. The ancient *Carcharodon* was probably 50 to 70 feet in length.

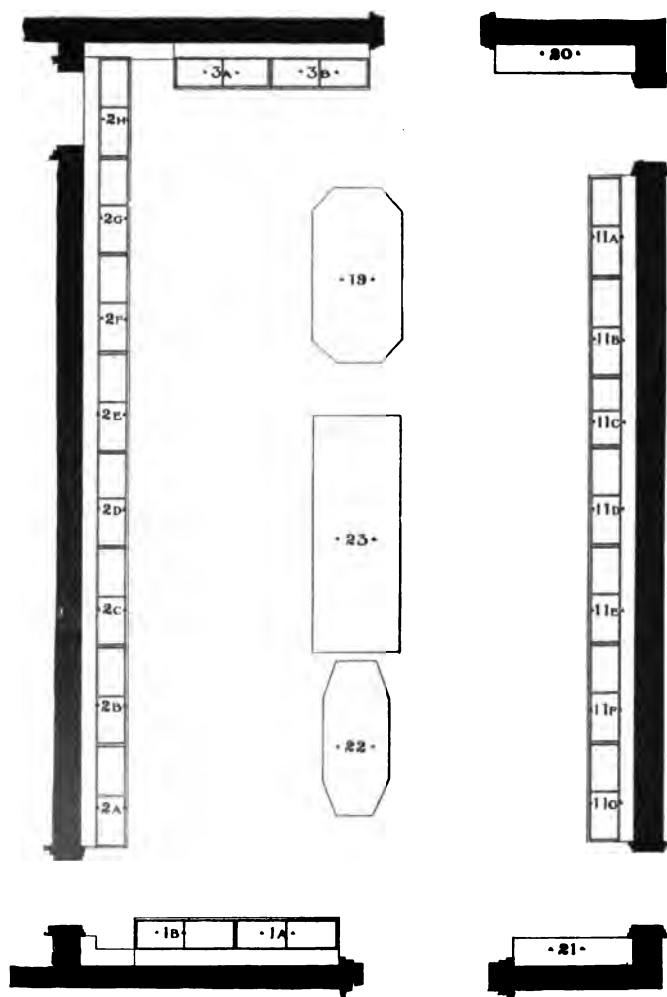
Pedestal 12.—Restoration of *Hadrosaurus* from the Upper Cretaceous of New Jersey. This was a huge land reptile, 28 feet in length, allied to the *Iguanodon*. It was probably a vegetable feeder, and able to stand and walk after the manner of birds.

Pedestal 14.—Cast of the skull of a *Mastodon* from the Miocene beds in the Sewalik Hills, India. Behind it, a femur of the same animal, and head and femur of *Diprotodon* (cast).

Pedestal 15.—Head of the *Dinotherium* (cast). This was a huge animal with a skull three feet long, herbivorous, and remarkable for two long tusk-like teeth, projecting downwards. It combined the characteristics of the elephant, hippopotamus, tapir, and dugong. A cast of its femur may be seen near by.

Pedestal 16.—A restoration of the skull of the *Elephas ganesa*, one of seven species of elephants existing during the Miocene epoch in India. It is remarkable for the length of its tusks, those of this specimen being ten feet long.

Pedestal 17.—Restoration of a skeleton of *Dinoceras*, from Wyoming. This was a five-toed Ungulate of elephantine size, but having no proboscis, and probably like the rhinoceros in its habits. It is marked by three pairs of protuberances on its skull



PLAN OF HALL 36.



which probably bore horns. In spite of the size of the animal its brain capacity was very small—only one-eighth that of a modern horse, as shown by a cast, Case 11D.

Pedestal 18.—Skeleton of *Irish Elk*, from Limerick, Ireland. A Post-Pliocene mammal of the Deer family, the bones of which are found in marl beneath peat beds in Ireland and England. The antlers of this animal have a spread of seven feet, and its height was nearly eight feet.

Case 11, Hall 35.—Tertiary and Quaternary fossils.

Case 11A.—Fossil turtles of the Tertiary period, including carapaces of *Stylomys* from Nebraska and of *Testudo*, from South Carolina; also turtle's egg from France.

Cases 11B and C.—The Cetacea, or whales of this period, are illustrated by vertebrae of the *Zeuglodon*. These animals were probably 70 feet in length. Their bones are so common in many places in the south as to be used by farmers for building fences.

Many remains of mammals from the Green River, Wyoming, beds, including skulls of the *Oreodon*, an animal which has been described as "a ruminating hog," and jaws, vertebrae, and limb bones of the *Titanotherium*, an animal allied to the *Dinoceras*. Also, skulls of the *Mesohippus*, a three-toed mammal about the size of a sheep, believed to be one of the ancestors of the modern horse.

Cases 11D and E.—Quaternary fossils. Leg bones of *Eurypteryx*, *Mesopteryx*, and other birds. These were post-glacial birds living in New Zealand. Large shells of *Ostrea*, or oyster, from the marl beds of North Carolina. Other invertebrates of this age.

Case 11F.—Bones of the post-glacial Hippopotamus, which lived at this time in England. Leg Bones of the Bison, from the same region.

Case 11G.—Teeth of ancient elephants—*Mammoth* and *Mastodon*. Skull of *Rhinoceros* (cast).

Carnivores, illustrated by skull of *Ursus* (cast), or ancient bear. Remains of *Homo sapiens*, or man, found in a cave on the island of Crete—probably very ancient.

Floor of Hall 35, Pedestal 19.—Restoration of *Glyptodon clavipes*. This was a giant Edentate, allied to the Armadillo. It existed during Quaternary times in South America. The specimen is 10 feet in length, the shell having a length of 5 feet.

Pedestal 23.—Restoration of *Megatherium Cuvieri*. This was another South American Edentate of the Quaternary epoch, which had one hundred times the bulk of any living species of this order. It had a wide range during this period, bones being found as far north as South Carolina. It was a huge, clumsy beast, its enormous femur, three times as thick as an elephant's, being used for supporting the animal while with its fore limbs it tore down branches of trees for food.

Pedestal 22.—Restoration of *Colossochelys atlas*, one of the huge turtles of the Tertiary period.

North Wall of Hall 35, Pedestal 20.—Leg bones of *Dinornis*, a huge wingless bird which inhabited New Zealand. The tibia is nearly a yard long and as large as that of a horse, and the egg, a cast representing the size of which may be seen in Case 11E, had a capacity of over a gallon. Also casts of limbs of *Sivatherium*, a four-horned antelope of elephantine size.

East Wall.—Casts showing heads of several species of *Bos*, ancestors of the modern cow; also, casts of the remains of a human skeleton found in limestone in Guadaloupe.

South Wall, Pedestal 21.—Casts of skulls of several species of elephants of this time, including the *Mastodon*, which was the largest of this class of animals. Casts of skulls of *Toxodon*, *Sivatherium*, *Nototherium*, and other large mammals.

HALLS 60 AND 61.

GEOGRAPHIC GEOLOGY.

The purpose of the exhibit of this department is to illustrate in a vivid and realistic way the surface configuration of the earth. The chief feature of the exhibit is a series of relief maps which reproduce on as natural and representative scales as practicable the topography and structure of selected portions of the earth's surface. A part of the series show only topography and culture, while another part show geological structure as well as topography. To some extent, the topography is shown on one map and the geological structure on another, so that both elements are represented with the greatest distinctness. The portions of the surface selected to be represented are usually such as to portray some typical form of surface sculpturing or of volcanic accumulation. Some, however, represent natural or political divisions.

In addition to the relief maps, there are models showing geological structure or illustrating methods of development. Some of these are dissected so as to show the more intimate structure of the formations. The exhibit also contains a collection of globes, wall maps, portfolios, and other geographic material. The following is a list of the principal features:

No. 1.—Relief Map of the Uinta and Wasatch Mountains, colored to show geological formation. Horizontal scale, 1 in., equals 4 miles, or 1.253440. Vertical scale, 1.126720.

No. 2.—Relief map of the Yellowstone National Park, showing Cañons of the Yellowstone and Madison Rivers, etc. Horizontal and vertical scale, 1 in., equals 1 mile, or 1.63360.

No. 3.—Relief map of the region of extinct volcanoes in Auvergne, central France, geological and topographical. Henri Le Coq and G. P. Scrope.

No. 4.—Relief map of the Ice Spring craters, a group of extinct volcanoes near Filmore, Utah, illustrating the successive formation and partial obliteration of craters and lava fields. Horizontal and vertical scales, 1.1200, 1 in. equals 100 feet.

No. 5.—Relief map of Massachusetts, from maps of the United States Geological Survey and the Topographic Survey of

Massachusetts. Horizontal scale, 1 in. equals 4 miles. Vertical scale, 1 in. equals 4000 feet.

No. 6.—Relief map of the United States and the Gulf of Mexico, exhibiting natural contours of the earth's surface. Horizontal scale, 1 in. equals 50 miles. Vertical scale, 1 in. equals 5 miles.

No. 7.—Elementary relief map of England and Wales.

No. 8.—Elementary relief map of Scotland.

No. 9.—Elementary relief map of Europe.

No. 10.—Relief map of the Grand Cañon of the Colorado of the West and the cliffs of Southern Utah, colored to show geological formations. Horizontal scale, 1 in. equals 2 miles. Vertical scale, 1 in. equals 5000 feet.

No. 11.—Relief map of Eureka District, Nevada, colored to show geological formations. Scale, 1 in. equals 1600 feet.

No. 12.—Relief map of Mount Desert Island, Maine. Scale, 1:40000.

No. 13.—Relief map of Mount Blanc. Horizontal scale, $\frac{3}{4}$ in. equals 1 mile. Vertical scale, $1\frac{1}{4}$ in. equals 1 mile.

No. 14.—Relief map of Yosemite Valley.

No. 15.—Relief map of Mount Shasta, showing topographical features.

No. 16.—Relief map of Mount Shasta, showing geological features.

No. 17.—Relief map of the Chattanooga District, showing topographical features.

No. 18.—Relief map of New Jersey, showing geological features.

No. 19.—Relief map of Palestine.

No. 20.—Relief map of the Arkansas River Drainage Basin.

No. 21.—Relief map of Carmel Bay, California, showing submarine valley.

No. 22.—Model of Henry Mountains and vicinity, Utah, showing geological formations and the effects of erosion.

No. 23.—Model showing the Henry Mountains and vicinity ideally restored before erosion took place.

No. 24.—Geological and relief map of the Henry Mountains showing the effects of erosion.

No. 25.—Same as the above, ideally restored before erosion took place.

No. 26.—Model of the Yosemite Valley.

No. 27.—Geological and relief model of Vesuvius and Monte Somma.

No. 28.—Relief model of the Island of Palma.

No. 29.—Model showing irrigation by ditches and furrows on steeply sloping fields.

No. 30.—Relief map of Mount Taylor, New Mexico, showing geological formations. Scale, 1 in. equals 1 mile.

No. 31.—Relief model of Leadville and vicinity, dissected to show geological structure. Scale, 1 in. equals 800 feet, or 1,9600.

No. 32.—Same as above, undissected.

No. 33.—Contour map, in relief, of Washoe mining region, 50 foot contours. Scale, 1:20000.

No. 34.—Geological and relief map of part of Blair and Bedford Counties, Pennsylvania.

No. 35.—Relief map of the Caucasus Mountains.

No. 36.—Relief map of the high plateaus of Utah, colored to show the geological structure. Scale, 1:1,680,000.

No. 37.—Relief map of the United States and the Gulf of Mexico, modeled on a section of a globe, 16½ feet in diameter. Horizontal scale, 1 in. equals 4 miles. Vertical scale, 1 in. equals 8 miles.

No. 38.—Geological relief map of Mount Ætna.

No. 39.—Topographic wall map of a portion of the west of Scotland, hatchured. Scale, 1 in. equals 1 mile.

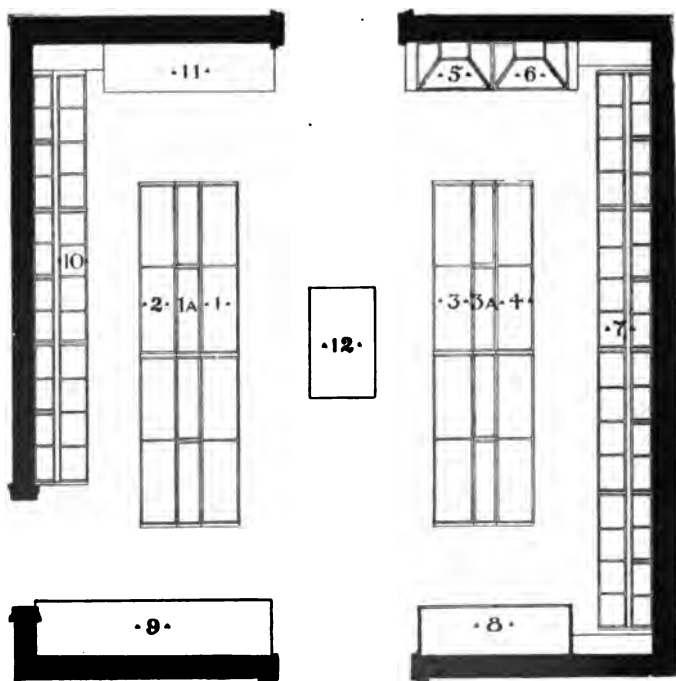
No. 40.—Same as above, without hatchures.

No. 41.—Bacon's library wall map of London and suburbs.

No. 42.—Geological wall map of England and Wales. Scale, 1 in. equals 15 miles.

No. 43.—Hotchkiss' geological wall map of Virginia and West Virginia.

There are also shown stereogram, hypsometrical and geological maps of France, the United States, Mexico, Russia, South America, China, Cuba, Arabia, the Antilles, and other countries. A complete series of the topographical maps issued by the U. S. Geological Survey is deposited in the Departmental Library, and can be examined on application to the Curator.



PLAN OF HALL 62.



HALL 62.

METEORITES.

The collection of Meteorites includes over 200 "falls," or "finds," represented by 4,077 specimens, which have an aggregate weight of 4,745.6 pounds. Besides these are sixty-three casts or models of notable meteorites. A complete catalogue of the collection will soon be issued. The material at present exhibited has been collected by H. A. Ward, of Rochester, N. Y., and George F. Kunz, of New York City. In the arrangement of the collection the specimens are divided into three classes, viz.: Siderites, Siderolites, and Aerolites. Under each of these divisions the specimens are placed in chronological order, beginning with the earliest, and the labels show the locality, date of fall or find, and weight of specimen.

Cases 1, 1A, and 2.—*Siderites*, These are meteorites composed chiefly of iron, with varying percentages of nickel, and frequently cobalt and manganese. Combined sulphur and phosphorus are also usually present. The surface of the siderites is smooth, as if fused, and more or less indented or pitted. Polished slabs, upon etching with nitric acid, usually show octahedral markings called Widmannstätten figures.

Case 1.—Specimens of earliest fall are irons from Toluca, Mexico, a meteorite found in 1784. Over twenty masses of this are shown, including polished slabs bearing the characteristic etching figures.

Other interesting specimens are sections of the Zacatecas meteorite, 72 grams; nearly 50 grams of the Cosby's Creek, Tennessee, iron; a large mass of the Signet iron, Tucson, Arizona, and a section of the Laurens County, South Carolina, siderite.

Case 1A.—Large masses of the Toluca, Mexico, iron; nearly 2,000 grams of the Bendego, Bahia, Brazil, siderite; 1,396 grams of the Brazos River, Texas, siderite; specimens of the Butcher Iron, Coahuila, Mexico; natural and etched specimens of the Glorietta Mountain, New Mexico, iron. Large masses

of the peculiar meteorite from Santa Catharina, Brazil. These masses have the form of rusty, porous nodules, and, owing to alteration, much resemble certain varieties of limonite. Group of Cañon Diablo, Arizona, siderites, the largest piece weighing 198.5 pounds. Polished and etched specimens of the same. One hundred pounds of the Kenton County, Kentucky, siderite.

Case 2.—A large number of specimens of the Santa Catharina iron, etched specimens of the Joe Wright Mountain siderite, twenty-three grams of the Lea iron, Tennessee; the Floyd County, Virginia, iron, entire, weight 29 pounds.

Cases 3, 3A, and part of 4.—*Aerolites*. These are meteorites made up largely of stony matter. The surface is usually black, smooth as if fused, and somewhat pitted. On breaking the thin black crust which covers the exterior, the interior is generally found to be of a grayish color, with scattered metalliferous particles. Analysis shows these meteorites to be made up largely of the silicates enstatite, olivine, and minerals of the pyroxene group, together with sulphides and phosphides of iron.

Case 3 and part of 4.—The aerolite of earliest date is that from Ensisheim, Germany, which fell in 1492. 26 grams are shown. Other interesting specimens are 200 grams of the stone from L'Aigle, France; 7 grams of the Bishopville, South Carolina, aerolite, remarkable for its light color and its composition of nearly pure enstatite; about fifty stones of the Pultusk, Poland, fall; fragments of the carbonaceous meteorite from Entre Rios, Argentine Republic; and two fragments of the recently discovered Beaver Creek, British Columbia, aerolite.

Case 3A.—Six hundred and nine aerolites of the Winnebago County, Iowa, fall, varying in weight from a few grams each to ten pounds. These stones fell over an area nine miles in extent at 5:30 P. M., May 2d, 1890. Some of the specimens were found in a hay stack. They are each individually perfect aerolites.

Case 3A (West Side).—Large slabs of the Farmington, Kansas, aerolite, which fell June 25th, 1890. Several masses of the Homestead, Iowa, aerolite.

Case 3A (East Side) and part of Case 4.—*Siderolites*. These contain iron and stony matter in about equal proportions. Olivine is frequently found filling the cavities of the iron,

Large slabs (10,985 grams) of the Fayette County, Texas, siderolite; Estherville, Emmett County, Iowa, stone, several large masses; Eagle Station, Carroll County, Kentucky, iron; Atacama, Chile, siderolite; and many others.

Cases 5 and 6.—Siderolite, or Pallasite, from Kiowa County, Kansas, found 1889, nine pieces. The mass in Case 5 weighs 465 pounds, the largest in Case 6, 344.5 pounds. There are also three smaller masses, and three or four slabs cut to show the structure of the iron, the cavities of which will be seen to be filled with olivine.

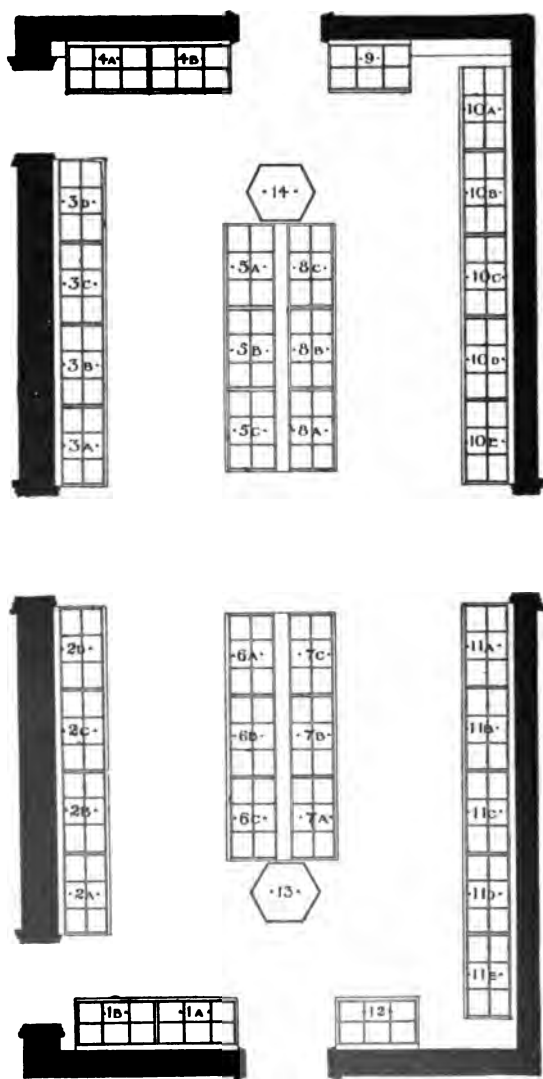
Case 8.—Aerolite from Phillips County, Kansas. One large mass broken into 2,934 pieces. The aggregate weight of these is 1184.5 pounds, making the largest weight of any single meteoric stone known to be collected in one case. The surface will be seen to be deeply pitted and oxidized. The stone as it fell struck upon a ledge, shattering it into a large number of pieces. All that could be found of these were collected, and are shown in this case.

Cases 7 and 10.—Casts of notable meteorites.

Cases 9 and 11.—Models of the enormous Chihuahua, Mexico, siderites, masses which have never been removed from their original position, and have been seen only by travelers.

Case 12.—Two large masses of Cañon Diablo, Arizona, meteorites, weight 1013 and 265 pounds. This locality has recently been discovered and described by Prof. A. E. Foote, and has yielded a large number of specimens. Recent investigations by Mr. Geo. F. Kunz show the presence in these meteorites of minute diamonds.

East Wall.—Map, showing distribution of meteorite falls in the United States.



PLAN OF HALL 63.



HALLS 63 AND 64.

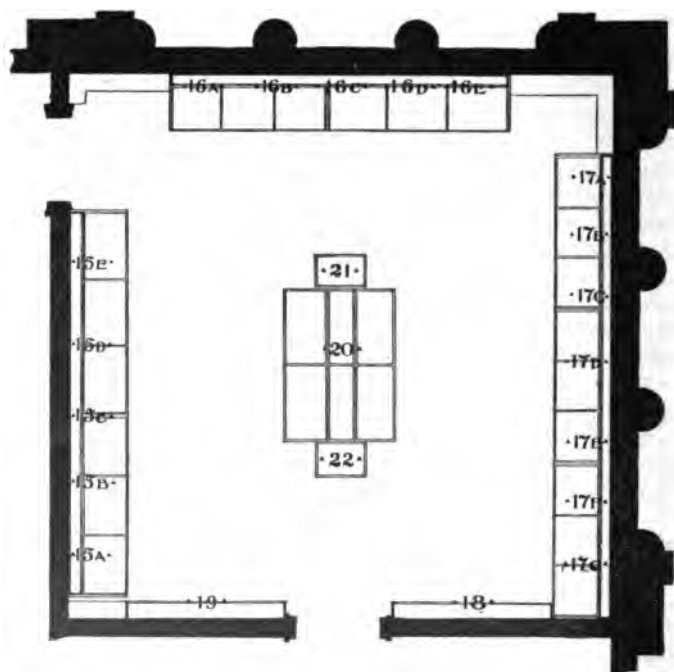
SYSTEMATIC MINERALOGY.

The systematic collection of minerals numbers about 5,000 specimens. The arrangement of the collection is based upon that given in Dana's New System of Mineralogy, and so far as possible the purpose has been to illustrate the different species there described. A copy of this work may be found in the library. The order which is to be followed in a study of the collection is shown by the numbering of the cases. Thus, entering Hall 63 from the south, the visitor finds case No. 1 at his or her left, and the order then follows along the west wall through the oxides in Case 4, back on the western side of the center aisle, down the eastern side, and back along the east wall; then passing to Hall 64, the order continues with the phosphates in Case 15 on the western side and ends with Case 17 on the eastern side.

The large headings above each case indicate the groups to which the specimens beneath belong, and in each division corresponding to these are tables showing the chemical composition and system of crystallization of these minerals. The individual specimen labels show the name of the species and the locality.*

Cases 1A, 3A, 4, 6B, 8A, 10B, 15, 16.—As specimens worthy of especial notice may be mentioned, among the sulphides, Case 1A, the large crystals of stibnite from Japan; among the haloids, Case 3A, the beautiful green and purple fluorites from English and American localities; among the oxides, Case 4, the extensive collection of natural and artificially colored agates from South America; among the carbonates, Case 6B, the curiously distorted calcite crystals, sometimes called "butterfly twins," from Egremont, England, and the brilliant groups of the same mineral from the Big Rig Mine, Cumberland, England; Case 7A, the Flos Ferri aragonites, which look like triumphs of the confectioners' art, and the delicately tinged stalac-

*Owing to the lighting of the hall from above, a good observation of the specimens is somewhat hindered by the reflection from the cases. In order to avoid this the observer is advised to view the specimens from the side rather than from the front.



PLAN OF HALL 64.

tites of the same mineral from the Copper Queen Mine, Arizona; among the silicates, Case 8A, the large crystals of Amazon stone from Pike's Peak, Colorado, and, Case 10B, the transparent and perfect crystals of topaz from Siberia; among the phosphates, Case 15, the richly colored vanadinites from Arizona, and among the sulphates, Case 16, the brilliant groups of celestite from Sicily.

Case 13.—A collection of natural and polished specimens of agatized wood from Arizona.

Case 14.—A large display of the beautiful rubellite in lepidolite from San Diego County, California, and some massive gypsum crystals from the cave in Wayne County, Utah, which was recently opened by Prof. J. E. Talmage, of Salt Lake City. These crystals are of remarkable size, some being nearly four feet in length, and are nearly transparent.

Case 17A.—Following the end of the systematic collection in Room 64 is a small collection of pseudomorphs, which illustrates the way in which one mineral may imitate or replace another.

Cases 17B and C.—A series illustrating the physical properties of minerals, such as form, structure, diaphaneity, lustre, hardness, and specific gravity.

Cases 17D, E, and F.—A series of crystal models, representing the typical forms and position of the axes in the six systems of crystallization. Together with these are a number of models of crystals of the more common mineral species, and some of the crystals themselves. The models are mounted in their true crystallographic position, and are intended to illustrate not only the proper position, but also the distinctive crystal forms which characterize the common minerals.

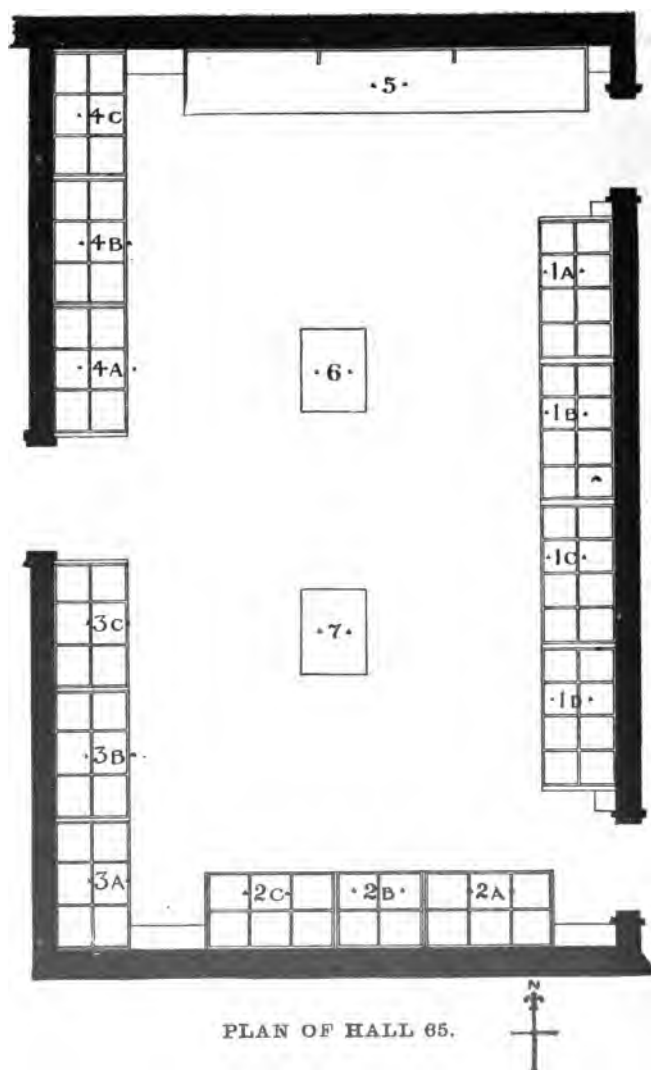
Case 17G.—A series of models of famous gold nuggets.

Cases 18 and 19.—Gem minerals, showing in the native state the minerals which are the source of gems and ornamental stones.

Case 20.—A small collection of the cut stones is contained in this case. Others may be seen in the Department of Industrial Arts.

Case 21.—Slab of lapis lazuli from Peru, said to be the largest single block ever quarried.

Case 22.—Group of amethyst crystals from Thunder Bay, Lake Superior.



HALL 65.**STRUCTURAL AND DYNAMICAL GEOLOGY.**

Case 1A.—Dendrites.

Case 1B.—Volcanic products, illustrated by lavas, volcanic bombs, etc.

Case 1C.—Cave products, represented by stalactites and stalagmites. (See foot note, p. 47.)

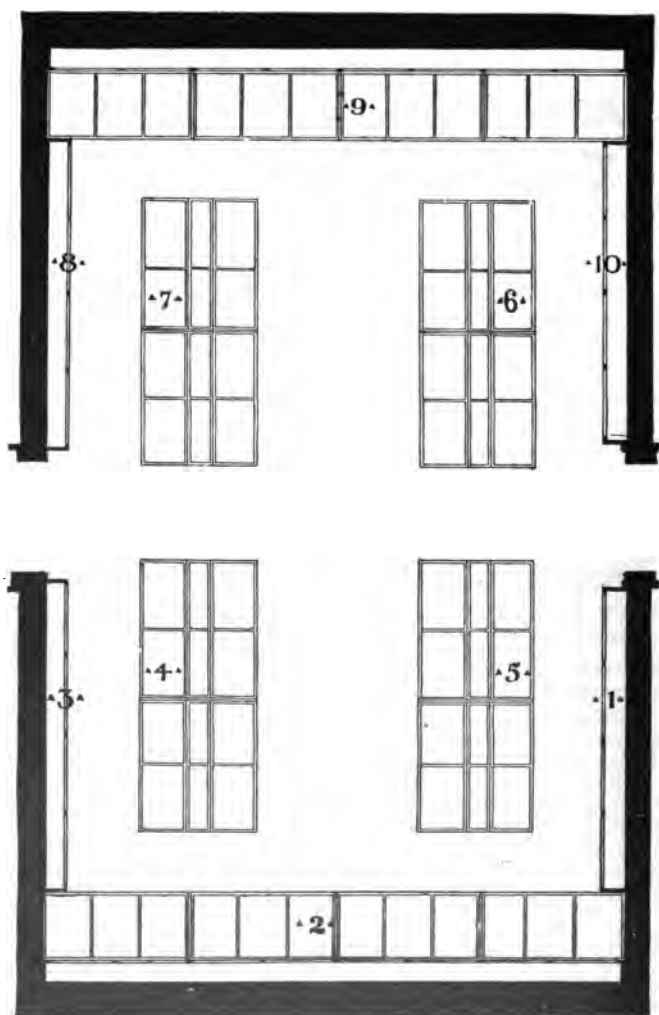
Cases 2 and 3.—Specimens representing varieties of rock structure. The specimen labels here show; first, the kind of structure; second, the name of the object; third, the locality. Among the specimens representing concretionary structure, the clay concretions are worthy of note, since they assume curious forms which are often mistaken by unscientific observers for fossil turtles, eggs, or fruits.

Cases 2C and 3.—Septaria, geodes, specimens illustrating nodular, ðolitic, pisolitic, and spherulitic—which are really varieties of concretionary—structure, cellular, porphyritic, and stratified structure.

The septaria are produced from concretions by drying and subsequent filling of the cracks with calcareous matter. The resemblance of these to a turtle shell is often very striking, and their handsome appearance when cut and polished is shown by several specimens.

Case 4.—Specimens illustrating rock texture; veins; the effects of erosion by water, sands, and other agencies; ripple-marks, which are the preservation in stone of lines once made by ripples on a mud-flat; striation and polishing produced by glacial action; faulting; and metamorphism.

Case 5.—Various large specimens of types already mentioned, including a large septarium from Perry, New York; a large slab showing mud cracks from Holyoke, Mass.; two slabs showing fluting and polishing due to glacial action, from Kelly Island, Ohio. In the middle of the room will be found a large slab showing ripple marks, and a collection of basaltic columns from the Giant's Causeway and the Rhine Valley. The grouping of the latter is intended to illustrate the stair-like arrangement which is usually seen in basaltic cliffs that have been exposed to erosion. Further description and explanation of any of the types of structure represented may be obtained from Geikie's Text Book of Geology, Dana's Manual of Geology, or Le Conte's Elements of Geology, to be found in the Museum Library.



PLAN OF HALL 66.



HALL 66.**LITHOLOGY.**

This section includes two collections: one of rock specimens systematically arranged, and one of polished and ornamental stones. The former includes about 1,800 specimens of uniform size, 4x3x1 inches, representing the different kinds of rocks. The latter is made up of about 200 specimens of polished slabs of different sizes, and is intended to illustrate the different ornamental stones, chiefly marbles and granites. It may, however, be considered a part of the systematic collection, the polished slabs having been placed as near as possible to the corresponding specimens in the former, so that the two may be studied as one if desired. They will be so described here. As in other sections of this department, the numbering of the cases indicates the order of the arrangement. The series begins at the left of the eastern entrance to Hall 65.

The rock specimens are classified under three heads: Eruptive, Sedimentary, and Metamorphic. The Eruptive rocks are those which have been formed at great depths, and were once in a state of igneous fusion. Being most deeply seated they may be considered to be the primary rocks of the earth's crust, so far as it is known. From these, aqueous agencies form the Sedimentary rocks by erosion and deposit, or by chemical precipitation. The latter in turn may be changed to Metamorphic rocks by dynamical and chemical agencies, which, however, do not usually destroy the lines of stratification.

Cases 1, 2, 3, 4, and part of 5.—Eruptive rocks. The classification which has been adopted for these is based upon the following plan:

First, an arrangement according to percentages of silica; the highest in silica, or acidic rocks, being placed at the beginning of the series, then those having lower percentages, down to the lowest, or basic rocks.

Under the divisions representing different percentages of silica are placed, first, the coarse grained, or holocrystalline rocks, then those of finer grain or having a porphyritic structure (porphy-

ries, etc.), down to the amorphous rocks. Thus, beginning with the granites, which have from 80 to 65 per cent. of silica, we pass among the coarse grained rocks to the diorites, which have between 65 and 55 per cent., then to the gabbros and diabases, having usually more than 45 per cent., and end with the peridotites, having below 45 per cent. A corresponding series begins with the syenites, and ends with the nepheline rocks.

Cases 1, and part of 2.—First row, *granite* and its varieties, such as *granitite*, *graphic granite*, etc. These are rocks having quartz, alkaline feldspar, and one or more minerals of the mica, amphibole, or pyroxene groups as essential constituents.

Second row, *granite-porphry*, *quartz-porphry*, *vitrophyre*, *felsophyre*, etc. Like the preceding in composition, but more or less porphyritically developed.

Third row, *rhyolite*, *nevadite*, *pumice*, *obsidian*, etc. These are amorphous volcanic rocks, having high percentages of silica, usually more than 70 per cent.

Upper Part of Cases 2 and 3.—Polished slabs, chiefly *granite*, with some *marbles*.

Remainder of Case 2, and Case 3.—*Syenite-nephelinite* series.

FIRST GROUP.—First row. *Syenite*, *minette*, etc. Holocrystalline rocks, having orthoclase and biotite as essential constituents.

Second row. *Trachytes*. Tertiary eruptive rocks, characterized by the predominance of an alkaline feldspar, usually sanidine, and freedom from quartz. An iron bearing mineral is also usually present.

SECOND GROUP.—First row. *Nepheline* or *elaeolite syenites*, rocks comprised of nepheline, orthoclase, and usually a pyroxenite mineral and plagioclase feldspar.

Second row. *Phonolites*, rocks consisting of an alkaline feldspar, with minerals of the nepheline and leucite groups, and usually a monoclinic augite.

THIRD GROUP.—*Tephrites* and *basanites*, rocks having nepheline or leucite and lime-soda feldspar, as essential constituents. They are usually porphyritic in structure, with a more or less amorphous ground mass.

FOURTH GROUP.—*Kersantite*, *leucite basalt*, *leucitite*, *nepheline basalt*, and *nephelinite*. Rocks containing leucite or nepheline in place of feldspar, and these usually associated with augite.

Case 4 and part of Case 5.—FIRST GROUP, *diorite* and *varieties*—holocrystalline rocks, having plagioclase feldspar and hornblende or black mica as essential constituents.

Second row, *andesites* and *dacites*, amorphous or porphyritic rocks, composed of soda lime feldspar, black mica, hornblende, and in the case of the *dacites*, quartz.

Third row. *Porphyrites* of various kinds.

SECOND GROUP.—First row, *gabbros* and *norites*. Rocks consisting of a basic soda lime feldspar, with diallage, or other pyroxene.

Second row, *diabases*, rocks having plagioclase feldspar and augite as essential constituents.

Third row, *basalts*, *dolerites* and *melaphyres*. The former are common rocks widely distributed in the form of dikes and intrusive sheets. They are popularly known as trap rocks. Their composition is like that of the preceding.

THIRD GROUP.—First row, *pyroxene rocks*, *diallagite*, etc. Basic rocks, composed largely of pyroxene.

Second row, *peridotite* and varieties, including *herzolite*, *picrite*, and *dunite*. These are highly basic rocks, composed chiefly of olivine, but having chromite and other iron oxides usually present.

Remainder of Case 5, Cases 6 and 7.—Sedimentary rocks. Rocks formed as chemical precipitates are placed first. These include *hematite*, *limonite*, *calcareous tufa*, *oölitic* and *pisolitic limestones*, *onyx*, several polished slabs of which are shown, *serpentine* and its varieties, also illustrated by many polished slabs, *talc* or *steatite* including *verd-antique marble* and *ophite*, *gypsum*, *alabaster*, etc.

Then follow rocks formed as sedimentary deposits, and fragmental in structure. The principal varieties of these are arranged in this order: *sandstone*, *conglomerate*, *breccia*, *quartzite*, *shale*, *clays*, *tufas* or *tuffs*, *coquina*, *chalk* and *limestones*.

Cases 8, 9 and 10.—Metamorphic rocks.

These are divided into the stratified or bedded, and foliated or schistose.

The first class includes the *crystalline limestones*, *marbles*, and *dolomites*. These are made up chiefly of the mineral calcite, and are formed from remains of mollusks, corals, and other ani-

mals, producing first limestone, which was changed by the action of heat to the crystalline condition. In some cases the original fossils remain intact, as is illustrated in many of the polished slabs.

Upper part of Case 9.—A large and complete collection of varieties of *marble*, the different colorings being produced largely by iron oxides, micaceous minerals, or finely distributed sediment.

Lower part of Case 9 and Case 10.—Following the *marbles* are placed the *crystalline schists*, which are rocks of variable composition, but characterized by a pronounced schistose structure, especially where mica is the prevailing constituent. Here are included *argillite*, *clay-slates*, *eclogite*, *quartzite*, *phyllite*, *paragonite schist*, *chlorite schist*, *mica schist*, and others.

Last in the series appear the *gneisses*, a class of rocks essentially like the granites in composition, but differing from them in structure, in that the constituents are arranged in approximately parallel bands or layers. These are the oldest of crystalline rocks, and are considered by many to represent portions of the primeval crust. Others, however, regard granites as the last term in the metamorphism of such rocks, and for that reason the gneisses have been placed in juxtaposition to them. *Varieties of gneiss*, based upon the prevailing mineral, whether *biotite*, *muscovite*, *hornblende*, or others, are included here.

DIVISION OF ECONOMIC GEOLOGY.

It is the purpose of the collections shown in this Division to illustrate modes of occurrence in Nature of the minerals and ores which have economic importance, to show the localities from which they are obtained, the processes used in their extraction and treatment and their applications to human arts and industries.

The specimens have for the most part been gathered from exhibits made in the Department of Mines and Mining of the Columbian Exposition, and were secured to the Museum by the Chief of that Department.

They may be conveniently classified into four groups which can be most readily inspected in the order named.

Building Stones and Quarry Products, Halls 67 and 68.

Carbon Minerals, including Coals, Petroleum, etc., Halls 69, 70 and 71.

Ores and Products of the Precious Metals and Lead, Hall 72.

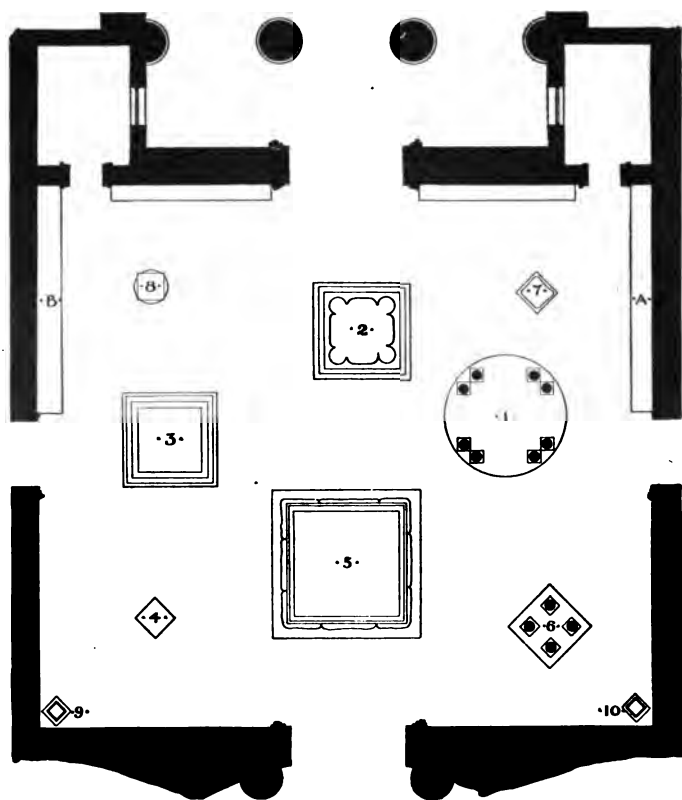
Ores and Products of the Useful Metals, Hall 79.

Fictile Materials and Non-Metallic Minerals of use in the Arts, Halls 77 and 78.

There are also included in this Division, a Departmental Library and Laboratory, the office of the Curator and the section of Metal Working Industries of the Department of Industrial Arts.

In the arrangement of the collections a series of type specimens of each group of minerals, is placed first. Then follow specimens illustrating different localities, arranged in geographical order, passing eastward from California. Then are illustrated, so far as the material at hand permits, methods of mining, processes of reduction or manufacture and finished products showing the uses of the metal or mineral.

The collections include, among other unique features, the Kunz collection of platinum ores and concentrates, a valuable collection of gold nuggets, from the placer mines of the State of Washington, the large and complete collection of mineral oils and their products, made by the Standard Oil Company, the statistical column prepared by the United States Geological Survey, and a unique series of transparencies enlarged from wood engravings in *De Re Metallica*, showing processes of mining and metallurgy in the sixteenth century.



PLAN OF HALL 67.



HALLS 67 AND 68.**BUILDING STONES AND QUARRY PRODUCTS.**

Hall 67 contains various large specimens of marbles and sandstones obtained from exhibits at the Exposition, which are arranged as follows:

No. 1.—Column of sandstone pillars capped with grindstones. There are placed in the openings, currier's blocks, and pocket cutlery and edged tool grindstones. All are from northern Ohio from strata of the Carboniferous age.

No. 2.—Fountain of Italian marble from Genoa, Italy; 300 years old; made by Count Fratenello.

No. 3.—A pyramid of various marbles from Greece.

No. 4.—An anvil, hammer, and cog-wheel chiseled from Bedford, (Ind.) sandstone.

No. 5.—Four mantel pieces, surrounding an obelisk all made of varieties of marble from Norway.

No. 6.—Eight Costa Rica vases, cut from porphyry and sandstone.

No. 7.—Sandstone, Indiana.

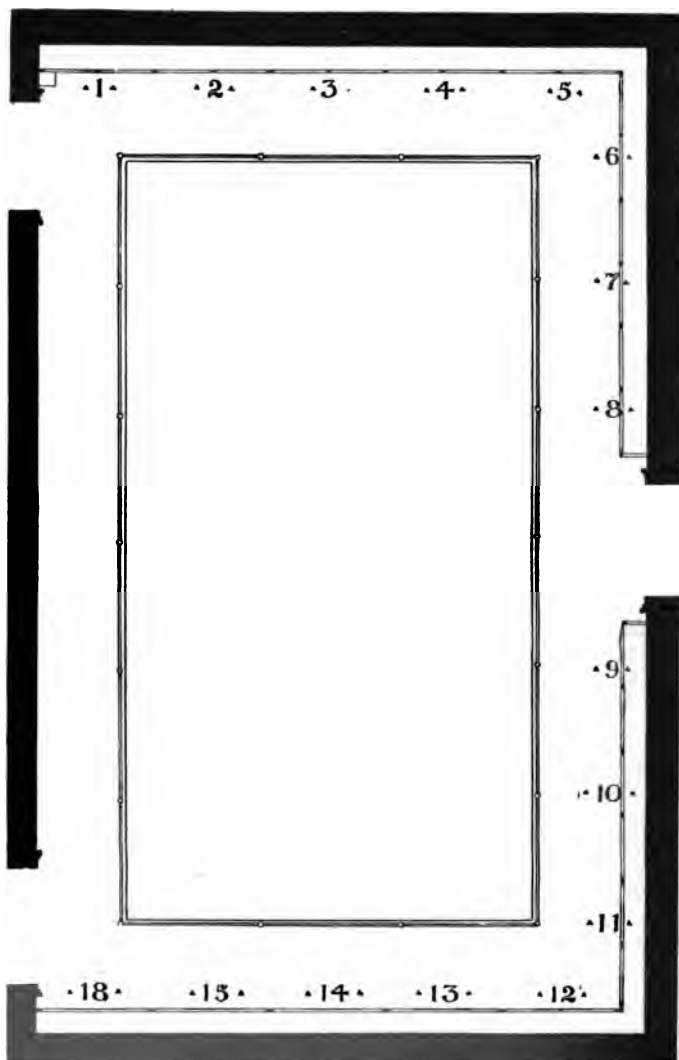
No. 8.—Pyramid of building stones, including sandstones from Ohio and Connecticut, granites from Maine, etc.

Nos. 9 and 10.—Sandstone Column, New South Wales, capped with vases of sandstone from Costa Rica.

Platforms A and B.—Various granite and sandstone columns. Blocks of polished marble—Greece.

Hall 68 contains specimens which illustrate the various building stones of the United States. Cubes of these cut to a uniform size show on their faces the following kinds of rock finish: rock face, pointed face, patent hammered, square drove, tooth chiseled and sawed face.

Artificial and ornamental stones are also illustrated by a large number of specimens.



PLAN OF HALL, 69.



CARBON MINERALS.

The minerals of which carbon is the chief or only constituent, afford a vast variety of products useful to man.

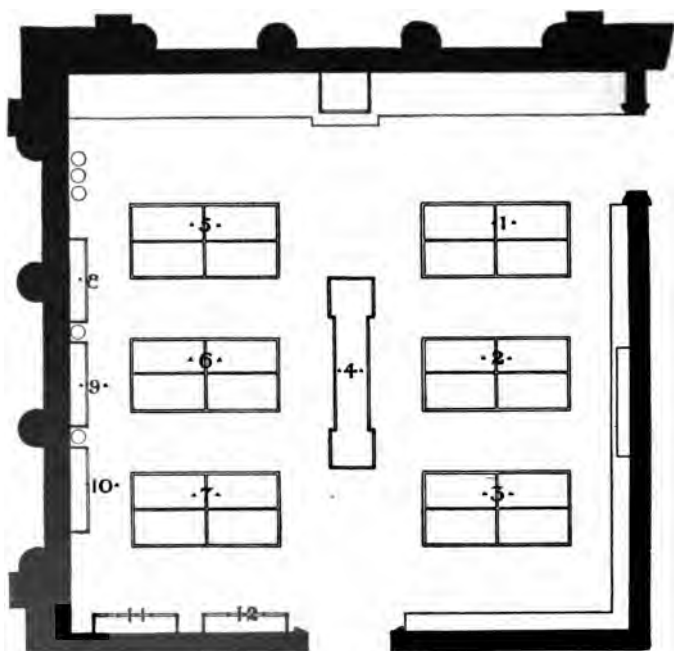
In the group are included the diamond, hard, transparent, lustrous and graphite, soft, black and dull; with them the great variety of mineral coals, petroleum, bitumens, asphaltum, etc. They furnish gems, fuels, sources of illumination, dyes, medicines, lubricants, paving and roofing materials, etc. A knowledge, therefore, of their characteristics and modes of occurrence in nature, is of great importance. They are illustrated by the collections in Halls 69, 70 and 71.

HALL 69.

Here one may study the distribution and extent of the coal fields of the United States, also the kinds of coal produced by each and the available means of transportation.

On a large plate-glass map in the center of the hall, scale ten miles to one inch, the coal fields of the United States as at present developed are indicated by areas in black, and the principal railroads connecting them are also represented.

Cases 1-18 contain specimens taken from these different fields, the exact locality of each being shown by red figures on the labels corresponding to those on the map. The order of numbers is the same as the alphabetical order of the States. The specimen labels show the uses of the coal, the name of the operators of the mine, the means of transportation and the markets. Analyses have been made of all the specimens and this data will be given to any one desiring to obtain it, on application to the Curator



PLAN OF HALL 70.



HALL 70.

This hall contains a series of the carbon minerals, beginning with the diamond and passing through graphite, the coals, (anthracite, semi-anthracite, semi-bituminous, bituminous and lignite) to bitumen and asphalt.

Case 1A.—Diamonds from Kimberly Mines, South Africa. "Blue Ground" or matrix in which diamonds occur, from DeBeers mines, Cape Colony, South Africa.

Case 1B.—Graphite and manufactured articles in which graphite is an important constituent.

Case 2A.—Varieties of anthracite coal with analyses showing the heating power of each.

Case 2B.—Semi-anthracite coal; Semi-bituminous coal; Bituminous coal.

Case 3A.—Cannel coal; Bituminous coal.

Case 3B.—Lignite; Woody Fibre; Peat.

Case 4.—Crude and Refined Petroleum.

Case 4A.—Coke—48 and 72 hours.

Case 4B.—Eggette and block coal, manufactured from slack.

Case 5A.—American, German and French manufactured pressed coal; Coal shales; Fossils of the coal measures.

Case 5B.—Varieties of coke.

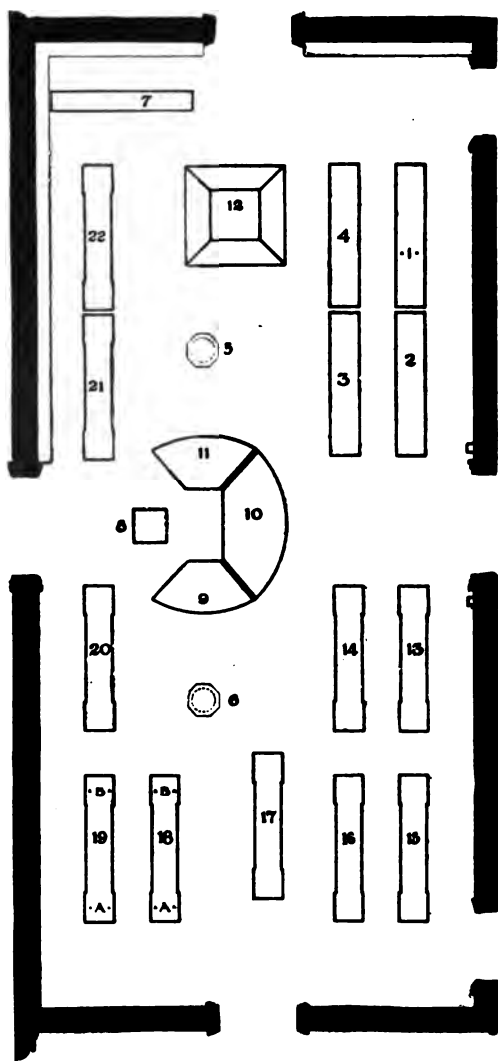
Case 6A.—Liquid Bituminous coal; Petroleum shale.

Case 6B.—Asphaltum minerals.

Case 7.—Applications of Asphaltum.

North Platform.—Section of coal seam five feet in thickness, from Duckenfield and Merthyr collieries, New South Wales. Blocks of anthracite coal one to four feet thick, from Pennsylvania, Washington and West Virginia. Kerosene shales and cannel coal, New South Wales. Block of asphaltum weighing one ton, California.

Cases 8-12.—Varieties of coal from various localities.



PLAN OF HALL 71.



HALL 71.**PETROLEUM AND ITS DERIVATIVES.**

This hall contains the very complete collection made by the Standard Oil Company to illustrate modes of occurrence in nature of the mineral oils of the United States, the methods used for distilling and refining them and the products obtained. It contains a specimen of crude oil from every pool in the United States; specimens of various oil bearing sands and minerals of the oil strata; models of oil refineries and a complete series of the products of petroleum. Being so complete in all its details, it is believed that it will be found well worthy of careful study. By following the order given below, the visitor will find illustrated: (1), the natural history of petroleum; (2), its manufactured products, and (3), the uses or applications of these.

Cases 1, 2, 3 and 4.—Crude petroleum, one specimen from every pool in the United States. The States represented are Pennsylvania, New York, West Virginia, Ohio, Indiana, Illinois, Kentucky, Louisiana, Texas, New Mexico, Kansas, Colorado, Wyoming and California.

The specimens are arranged to show gradations of color, this being seen to vary from black, through shades of dark green and brown, to amber, the greenish brown being most common. The light colored oils, though more attractive in appearance, do not have the value for economic purposes, of the black, thick oils.

East Wall.—Tubes filled with drillings from the successive strata passed through in search for oil. One of these represents a huge producer in the MacDonald field. A piece of the sandstone from which the oil was obtained is placed at the bottom.

West Wall.—Chart showing a geological section between Olean, N. Y., and Fort Wayne, Ind. Note the position of the oil bearing sands in these and the comparatively undisturbed condition of the strata. Such conditions have been favorable to the storage of vast quantities of petroleum and gas.

Cases 5 and 6.—Specimens of oil bearing rocks from a large number of localities. Besides sands will be seen limestones and sandstones, which show that compact rocks bear petroleum as well as loose sands.

Case 7.—Minerals and fossils of the oil bearing strata.

Case 8.—A large bottle—the largest ever blown—representing one barrel of petroleum. This is about the amount produced in the United States every two-thirds of a second of the year, day and night.

Cases 9, 10 and 11.—The products of the barrel of petroleum represented in Case 8, arranged according to the order in which they are obtained. These are (1), naphtha; (2), burning oils, and (3) residuum or petroleum tar. The processes and products of further distillation of the latter will also be seen.

Case 12.—Model of a modern oil refinery. The crude oil from the pipe lines is received in storage tank No. 1, and pumped from this tank to the crude oil still No. 2, where it is gradually heated until the naphtha and burning oils are driven off by distillation and passing through the condenser and receiving house are collected in tanks 3, 4 and 5. The burning oil distillates are pumped to the large agitator where they undergo chemical treatment to render them fit for consumption. The crude naphtha is then redistilled in naphtha still No. 3, giving the various grades of gasolines and naphthas. The tar left after the first distillation is transferred to the tar still No. 6, where it is separated into light paraffine oil, heavy paraffine oil and still coke which remains in the still. The light distillate is used for fuel oil. The heavy oil is sent to the paraffine wax press house, where it is chilled and pressed to remove the paraffine oil, leaving the wax. The coke remaining in the still as a final residue is used for the manufacture of electric light and battery carbons. The reduced oil still is used for the production of lubricating oils.

Above this model will be seen one of the original refinery, built in Cleveland, O., in 1863.

The cases following show various finished products ready for sale, these being chiefly illuminating and lubricating oils with, however, a large variety of other useful articles.

Cases 13 and 14.—Fifty-six varieties of high-priced and low-priced burning oils, showing the standards of each required by the laws of different States.

Case 15.—Cylinder oils of different grades. These are the heavier, more sluggish lubricating oils.

Case 16.—Special grades of lubricating oils. These include spindle, sewing machine, screw cutting and engine oils. They are light bodied and quick feeding as compared with the cylinder oils.

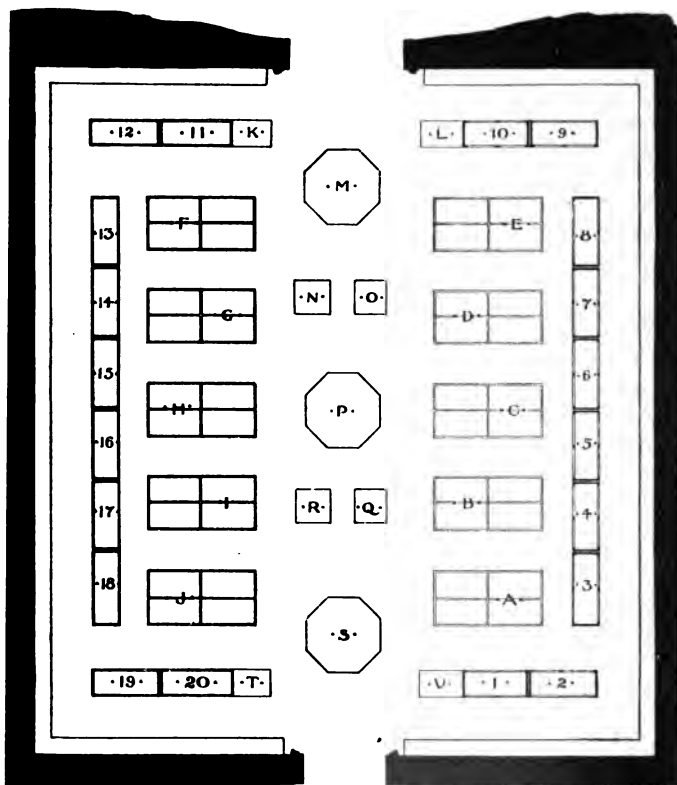
Case 17.—General lubricating oils, including miners' oil, leather oil and various engine oils.

Cases 18 and 19. — By-products of petroleum. These include paraffine wax, crude, semi-refined and refined, with illustrations of its uses for candles, matches, tapers, etc ; axle grease, lantern oil, harness oil, "miners' sunshine," the safest material for burning in miners' lamps ; vaseline products, such as cerates, pomades, soaps and face paints.

Case 20.—Special grades of illuminating oils. These oils are designed to give the best light obtainable under the laws of each State. They are liquids of remarkable purity and brilliancy, the two finest—Pratt's Astral and Eocene—being hardly distinguishable from distilled water in color.

Case 21.—High test illuminating oils.

Case 22.—Illustrations of some of the varied uses to which petroleum products can be put. These include waxed paper for wrapping purposes, water proof coating for explosives, varnishes, wood stains and fillers, rubber cements, electric light carbons, etc.



N —

PLAN OF HALL 72.

HALL 72.

PLATINUM, GOLD, SILVER, AND LEAD.

The collections in this Hall comprise the typical platinum, gold, silver, and lead ores, and the minerals of economic value that commonly enter into the composition of these. In the examination of these, as well as ores of other metals, it should be remembered that the mineral or metal is frequently present in such minute quantities that it cannot be seen by the naked eye or even with the aid of an ordinary magnifying glass. The ores usually possess, however, characteristics of appearance or of association with other minerals, known as gangue minerals, which enable a skillful observer to recognize them as being metalliferous.

There are also to be seen here products resulting from the milling and metallurgical treatment of the ores.

PLATINUM.

Case A.—Specimens illustrating modes of occurrence of platinum in nature, from over twenty different localities, including the States of Washington, Oregon and California, U. S. A., New Granada, S. A., and the Ural Mountains. In all of these the metal will be seen to be present in the form of flattened grains associated with iridium, osmium, palladium, gold, copper and chromite. The grains are usually found in river beds or placer deposits. A complete series of rocks and soils bearing platinum, from the Demidoff Platinum Mines, Nizhni Tagilisk, Ural Mountains is shown; a series of concentrates produced by washing these in order to separate the metal, and photographs of the mines and methods of working them. Some other uses of platinum are illustrated as follows: Russian platinum coin for a time used as money; coins struck in platinum and gilded, passed for gold in Portugal and Spain during the past century; bogus gold dust made of platinum grains plated with gold.

GOLD.

Case 1.—Type specimens showing modes of occurrence of gold in nature. These are—*crystallized gold*, Breckenridge, Colorado; *placer gold*, Washington; *free gold in quartz*, California; *associated with iron and copper pyrites*, Colorado, (note the difference in color between these and the metal, since they are often confused. Gold is soft, ductile and malleable, the pyrites are hard enough to strike fire with steel and are brittle); *combined with tellurium in sylvanite, petzite, etc.*, Colorado, (these are called the telluride ores); *in slate*, California.

Remainder of Case 1.—Gold ores. California.

Cases 2, 3 and 4.—Gold ores. Colorado. The collection from the Cripple Creek mines is especially notable, these ores being remarkable for their richness.

Case 5.—Gold ores. Australia.

Case 6.—Gold ores. Mexico.

Case B.—Collection of nearly all the known alloys of gold and silver with copper, tin, zinc, lead, arsenic, and other metals. Collection illustrating methods of saving gold and silver practiced by Messrs. Tiffany & Co., New York. Here are shown wash water, concentrates from an exhaust blower that collects the dust of the shops, pieces of flooring of the shops and shoes worn by workmen, and beside each of these are placed buttons of gold and silver obtained from articles of similar size to those shown.

Case C.—Large specimens of gold ores. Colorado and New South Wales.

Cases T and U.—Center of the hall. Collection of gold nuggets from the placer deposits of Kittitas County, Washington. These are flattened and rounded grains found in the river gravels from which they are separated by washing. The largest nugget in the cases weighs $13\frac{1}{2}$ ounces, which at the standard price of gold, \$20.67 per ounce, would have a value of \$279.04. The entire weight of the gold shown is 133 ounces, 10 pennyweights.

A series of photographs illustrates methods of placer mining. These vary in effectiveness from the crude miners' pan used in California in 1849, to the modern hydraulic methods, which consist of disintegration of the auriferous alluvium by the propulsion of

a heavy jet of water under pressure upon the bank, and washing of the gravel through sluices containing distributed mercury. The mercury forms an amalgam with the gold and thus holds it.

SILVER.

Case 7.—Type specimens of silver bearing minerals. These are in the order of their richness—*native or wire silver*, three fine specimens from the Mollie Gibson mine, Colorado, also specimens from Mexico and Chile; *argentite*, Saxony, 87 per cent. of silver; *Cerargyrite*, or *horn silver*, Chile, 75 per cent. of silver; *pyrargyrite or ruby silver*, Peru, 65 per cent. of silver; *proustite*, Chile, 65 per cent. of silver; *stephanite*, Saxony, 68 per cent. of silver. With these should be mentioned as silver bearing minerals, *tetrahedrite*, which sometimes contains as high as 17 per cent. of silver, *galena*, always containing some silver, and a number of rarer minerals.

Remainder of Case 7, Cases 8 and E. Silver ores from Colorado.

Cases 9 and 10.—Silver ores from Mexico and South America.

Cases 11, 12, 13 and 14.—Ores, chiefly from Colorado and New Mexico, which are worked both for the silver and lead which they contain. Galena is the most important mineral in their composition.

Cases F and G.—Products obtained at different stages in the process of extraction of gold and silver from their ores, as treated by the Argo Smelting Co. A chart giving a complete outline of the process may be seen on the wall near by. Processes of extraction used by other companies are also illustrated.

LEAD.

Case 15.—Type specimens of lead-bearing minerals. These are—*Galena* from Missouri, the most abundant lead mineral and the fundamental lead ore; it contains 86 per cent. of lead; *Cerussite*,

Arizona, lead carbonate, 77 per cent. of lead; and *Anglesite*, Sardinia, lead sulphate, 68 per cent. of lead.

Cases 16 and 17.—Lead ores from New Mexico and Mexico.

Case 18.—Lead ores from England, Australia, Spain and Greece.

Case 20.—Lead ores from Germany. Some of the specimens here are especially instructive as showing the characteristic structure of veins. The different minerals are arranged in bands or layers, the metalliferous layers alternating with those of quartz, barite or fluor spar.

Case H.—Different concentrates in the process of lead extraction.

Case I.—Collections showing the ore products of two Leadville, Colorado, mines. Though worked primarily for lead, by careful treatment, gold, copper, zinc and manganese are obtained from the ore.

Case J.—Uses of lead. Alloys of lead with other metals, sheet lead, shot, red lead, white lead.

The visitor should now pass to the eastern end of the hall and note the following special groups in the center.

K.—Silver, lead and copper ore, Cordillera Hill silver mine, Peelwood, New South Wales.

L.—Gold and silver ore, British Columbia.

M.—Gold and silver ore from the State of Washington and other American localities.

N.—Zinc-lead ore, Laurium, Greece.

O.—Copper-silver ore. Leadville, Colorado. Assays silver, 41 oz. per ton; copper, 18 per cent.

P.—Silver-lead ores. Barrier Range, New South Wales. Assays silver, 58 oz. per ton; lead, 72 per cent.

Q.—Copper-silver ore. Ouray County, Colorado. Assays copper, 28 per cent.; silver, 42 oz. per ton.

R.—Auriferous quartz. San Miguel County, Colorado. Assays average \$6 to \$8 gold per ton.

S.—Silver and gold ore from the State of Washington, and other specimens from American localities.

T.—Block of ore from 40 foot level of the Back Creek Silver

and Gold Mine, New South Wales. 36 tons yielded 3,406 oz. silver, and gold at the rate of 15 dwt. per ton.

U.—Auriferous Pyrite, Park County, Colo. Assays \$45 worth of gold per ton.

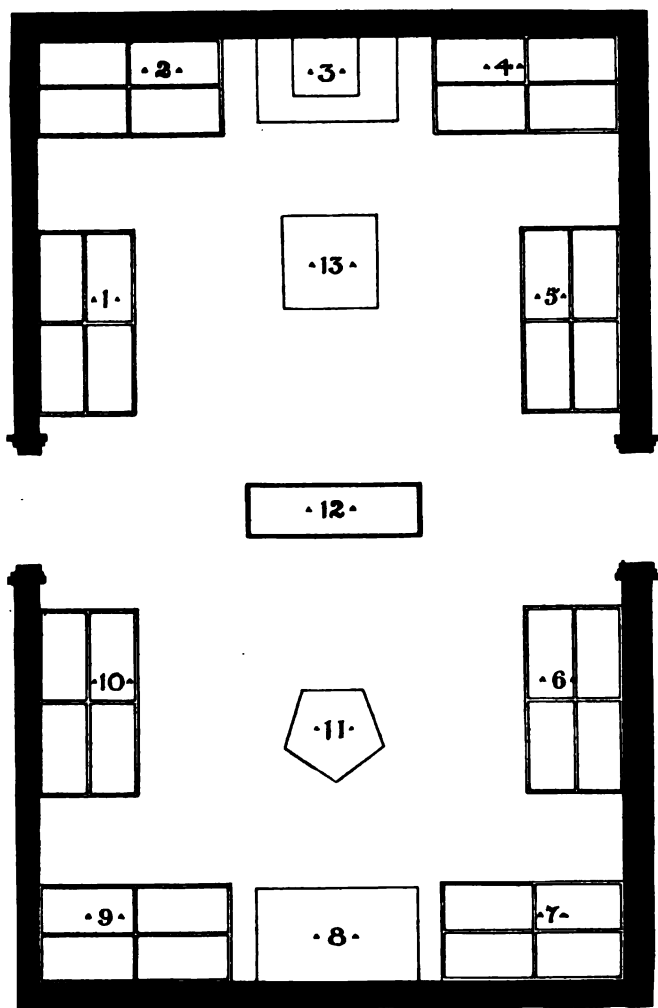
Around the walls of the room will be found, arranged in order, large blocks of gold, silver and lead ores, giving an excellent opportunity to study the characteristic appearances of such ores and the minerals most commonly associated together in them. The latter are quartz, fluorite and barite, copper and iron pyrites and galena. The rusty looking ores are simply more or less decomposed forms of the above.

HALLS 73, 74 AND 75.

Hall 73.—Office of the Department of Geology.

Hall 74.—Library of the Department of Geology. The works in this library treat of geology and kindred subjects, and are intended primarily for the use of officers of the Department. On application to the curator, however, opportunity will be given to visitors to consult any special work. The collection of photographs and autographs of leading geologists and mineralogists of the world, made by Mr. Geo. F. Kunz, is exhibited here.

Hall 75.—Laboratory of the Department of Geology. Here are shown apparatus and chemicals used in determining minerals and ores and illustrations of tests for the different metals. Assay furnaces and other laboratory appliances are also exhibited. On the walls are over fifty sketches enlarged from wood cuts in *De Re Metallica*, showing methods of mining and the metal working appliance used in the sixteenth century. Twenty-five photographs of the works at Playa Blanca, Chile, show furnaces and apparatus used in the treatment of ores of that locality.



PLAN OF HALL 77.



HALL 77.**FICTILE AND REFRACTORY MATERIALS,
PIGMENTS, ETC.**

Clay is the basis of most of the materials shown in this hall. Together with it however are associated sand, tripolite, feldspar, etc., for the various purposes for which it is used in the arts.

Case 1.—Varieties of clay and their uses. Some of these are kaolin, the finer varieties of which are used for porcelain, the coarser for fire brick; modeling clay; brick clay; pipe clay; mixed with feldspar for glazing.

Cases 2 and 4.—Articles made from fire clay and capable of withstanding a high degree of heat. They include assayers crucibles, muffles, ladles, stove linings, etc.

Platform 3.—Varieties of stoneware presented by the Canton Stoneware Co., Canton, Ohio.

Case 5.—Pottery and brick clays from foreign localities, including Brazil, Greece and New South Wales. Natural pigments used in coloring bricks and clays.

Case 6.—Varieties of fancy bricks and tiles.

Case 7.—Clays from American localities.

Platform 8.—Muffle and sewer pipe illustrating uses of clay.

Case 9.—A collection illustrating native tripoli and its uses, presented by the American Tripoli Co., of Carthage, Mo.

Case 10.—Ores and products of aluminium. Though aluminium is the metal contained in common clay, efforts to extract it cheaply from this substance have so far failed.

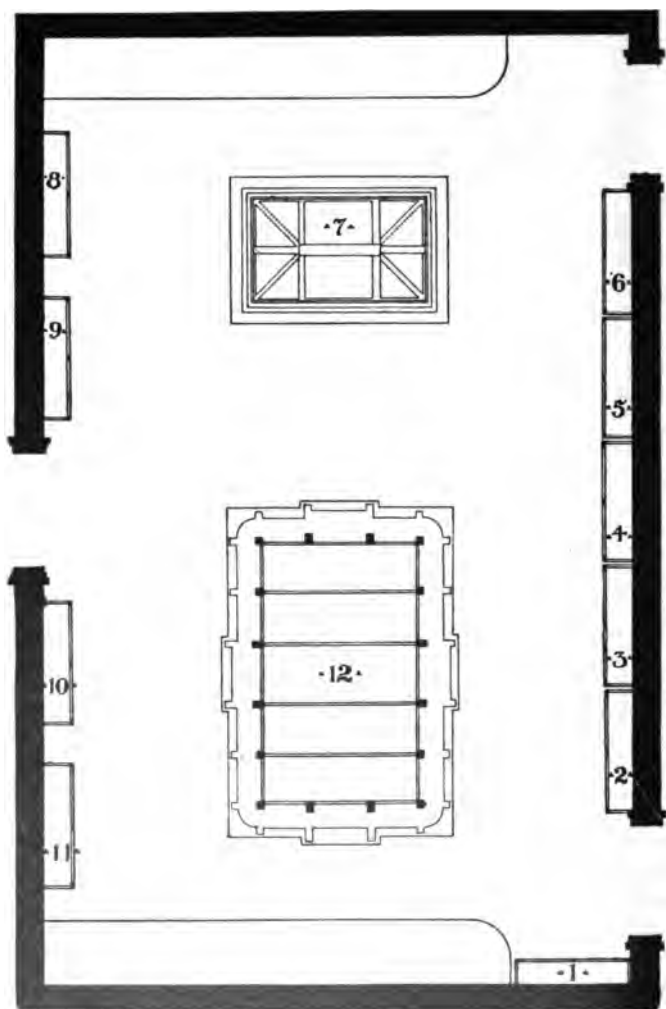
The ores from which it is obtained—bauxite and cryolite—are shown in the case, together with sheets of the metal and specimens of its alloys.

Platform 11.—Varieties and uses of Portland cement.

Case 12.—Natural Pigments used for paints and coloring matters.

Platform 13.—Varieties of Terra Cotta.

About the walls of the room are specimens of ornamental tiles and pottery illustrating uses of clay.



PLAN OF HALL 78.



HALL 78.

NON-METALLIC MINERALS USED IN CHEMICAL MANUFACTURE, AND FOR OTHER PURPOSES.

Some of the substances included under this group have a direct use, such as sulphur, salt, nitre, glauher salt, and alum. Again these and others are used for chemical purposes, as salt in the manufacture of chlorine; fluor-spar as a flux in metallurgical operations; pyrites and nitre in the manufacture of sulphuric acid.

Cases 1 and 2.—Different grades of domestic and English salt.

Case 3.—Gypsum for the manufacture of plaster of Paris.

Cases 4 and 5.—Sulphur, crude and refined.

Case 6.—Asbestos and associated rocks.

Case 7.—Complete collection of various forms of asbestos and its application, presented by the H. W. Johns Manufacturing Co.

Case 8.—Mica and its commercial uses.

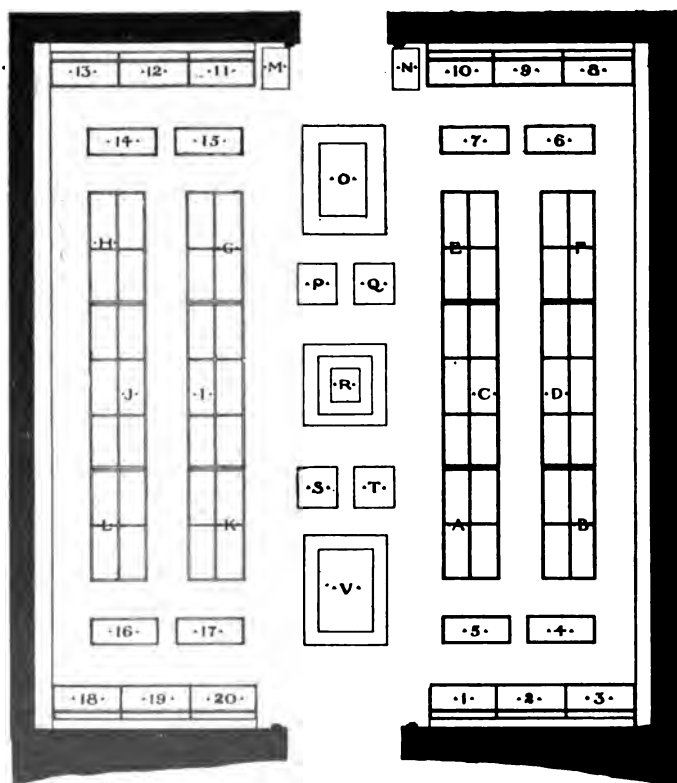
Case 9.—Magnesite; natural carbonate of magnesia from California.

Case 10.—Various natural and prepared salts.

Case 11.—American salts.

Case 12.—A miscellaneous collection:—phosphates from Florida; sulphur from Greece; natural and prepared salts from Germany. A large and particularly fine cube of rock salt from Russia deserves attention.

Platforms.—Large specimens of salt, gypsum, apatite—phosphate of calcium—fluorite, and iron pyrite.



PLAN OF HALL 79.

HALL 79.

**COPPER, ZINC, TIN, ANTIMONY, MERCURY,
NICKEL, IRON AND MANGANESE,**

The collections in this hall comprise the typical copper, zinc, tin, antimony, mercury, nickel, iron, and manganese ores, and the minerals of economic value that commonly enter into the composition of these. There are also to be seen products resulting from the treatment of some of the ores, maps illustrating localities where they are obtained and charts showing processes of extraction of the metals.

Under each group are placed first, type specimens of the different ores of the metal arranged in order of their richness; then specimens of ores which illustrate the different localities producing them, these being arranged in geographical order, passing from California eastward. Specimen labels show the mineral of the ore and the amount of metal produced from them, where this is known. It should be remembered that many of the ores produce more than one metal, in which case the specimen is placed in the group of the predominating metal.

COPPER.

Case 1.—The copper bearing minerals, arranged in order of their richness; the *native metal*, this being the character of most of the ore from the Lake Superior mines; the red oxide, *cuprite*, 83 per cent. of copper; the black oxide, *tenorite*, 80 per cent.; the black sulphide, *chalcocite*, 80 per cent.; the green carbonate, *malachite*, 57 per cent; the blue carbonate, *azurite*, 55 per cent.; the purple sulphide, *bornite*, 55 per cent.; the gray sulphide, *tetrahedrite*, about 50 per cent., the bluish green silicate, *chrysocolla*, 36 per cent.; and the brass yellow sulphide, *chalcophyrite*, 34 per cent.

Cases 2, 3, 4 and 5.—Copper ores from different mines of the world arranged in geographical order. Notable among them are a series from the Rammelsberg mines, Germany, showing the change in character of the ores in different parts of the

mines and the number of different metals that can be obtained from them; and a number of beautiful specimens of malachite and azurite from Arizona.

Case A.—A special series showing the rocks and ores from different levels of the Copper Queen Mine, Bishee, Arizona, presented by the Copper Queen Mining Co. Appended analyses show the metallurgical value of the different specimens.

Case B.—Copper ores, Arizona. Some large masses of malachite and azurite are particularly notable for their beauty.

Case C.—Uses of copper shown by sheet metal, wire, copper vessels, tubing, anodes for batteries, etc.

Case D.—Specimens illustrating successive stages in the process of copper smelting and separation.

On the adjacent walls are charts showing courses of treatment of copper ores practiced by different smelters. Below them are large masses of copper ores.

ZINC.

Case E.—Zinc ores from Missouri. The zinc bearing minerals of these ores are chiefly the black, resinous sulphide, *sphalerite*, containing 67 per cent. of zinc and the white amorphous silicate, *calamine*, 54 per cent. of zinc.

Case F.—Wisconsin zinc ores, the zinc being chiefly in the form of the white carbonate, *Smithsonite*, which bears 52 per cent. of zinc.

Cases 6 and 7.—Zinc ores from Spain and Germany. Note the parallel arrangement of the minerals in the latter, this being a characteristic of vein deposits. The chief mineral, *sphalerite*, is associated with quartz galena, pyrites, etc.

Cases 8, 9 and 10.—Zinc ores chiefly from Laurium, Greece and New South Wales. The former have long been famous for their varieties of color and richness of luster, making them very attractive to the eye. They are made up chiefly of the carbonate, *Smithsonite*.

Specimens illustrating the process of extraction of zinc are shown in Case 10.

TIN.

Case 11.—Tin ore from South Dakota. The tin is in the form of *cassiterite*, a black oxide which can be seen scattered through the granite. This is the universal ore of tin, containing about 78 per cent. of the metal. Some specimens of stream tin are also shown. This is formed by disintegration of the rocks containing the ore, and removal of the lighter minerals by running water. The cassiterite being very heavy stays behind and is found in the bed of the stream.

Case 12.—Tin ore from the famous Cornwall Mines of Great Britain, which have been in operation many centuries.

Case 13.—Process of reduction of tin ores illustrated by specimens from the Redruth Smelting Co.

ANTIMONY.

Case 14.—Specimens of *stibnite*, the universal antimony ore, from various localities in Japan, California, New South Wales and Greece. That from the latter country bears an appreciable percentage of gold. Other specimens illustrate the alloys of antimony which are of use in the arts.

MERCURY.

Case 15.—A series of ores containing *mercury* and *cinnabar* and the rocks associated with them, from the New Almaden mines, California. Cinnabar is the red sulphide and the mineral from which mercury is chiefly obtained. Stages in the process of roasting the ore for extraction of the metal are shown, and a chart near by illustrates the kind of furnaces used. Mercury ores from Spain and New Granada, S. A., are also shown.

NICKEL.

Cases G and H.—A complete series showing ores of nickel, processes of extraction and applications of the metal, presented by the American Nickel Works of Camden, N. J. Note as the

principal ores, the bronze colored sulphide *pyrrhotite*, the brass colored sulphide, frequently in capillary forms, *Millerite* and the apple green silicate, *Garnierite*.

Nickel ores from Canada, Oregon and New Granada. A chart near by gives the process of extraction of nickel from the Canadian pyrrhotite. As uses of the metal are shown specimens of plating, nickel steel alloy for armor, salts of use in the arts, etc.

IRON.

Case K.—Type specimens of the principal iron ores, these being the black, magnetic oxide, *magnetite*, 72 per cent. of iron; red oxide "specular iron," *hematite*, 70 per cent.; brown oxide, "bog iron ore," *limonite* 60 per cent.; carbonate, "spathic iron." *siderite*, 48 per cent.

Cases K, L, J, H.—Iron ore from various localities in the following order:—Washington, Colorado, Utah, Virginia, Great Britain, France, Germany, Spain, Russia.

A map on the wall shows localities of the United States producing iron ore. Several charts show types of blast furnaces used in the reduction of iron.

MANGANESE.

Cases 18 and 19.—Ores of manganese, chiefly the black oxides, *pyrolusite* and *psilomelane*. Specimens from Colorado, Virginia, Brazil and Great Britain. The minerals are used for the liberation of chlorine for bleaching, for staining glass and pottery, and in the manufacture of steel.

Case 20.—Varieties of steel, illustrating uses of iron and manganese.

CENTER OF THE HALL.

SPECIAL GROUPS AS FOLLOWS:

M. Gossan (iron ore), from Virginia.

N. Limonite (oxide of iron), from Virginia.

O. Mass of copper-nickel ore, from the Evans mine, Sudbury, Ontario, Canada, taken from the third level at a depth of

175 feet, and weighing about 12,000 pounds. Numerous large deposits of low grade nickel ore have recently been discovered in

P. Limonite (brown oxide of iron), from Russia.

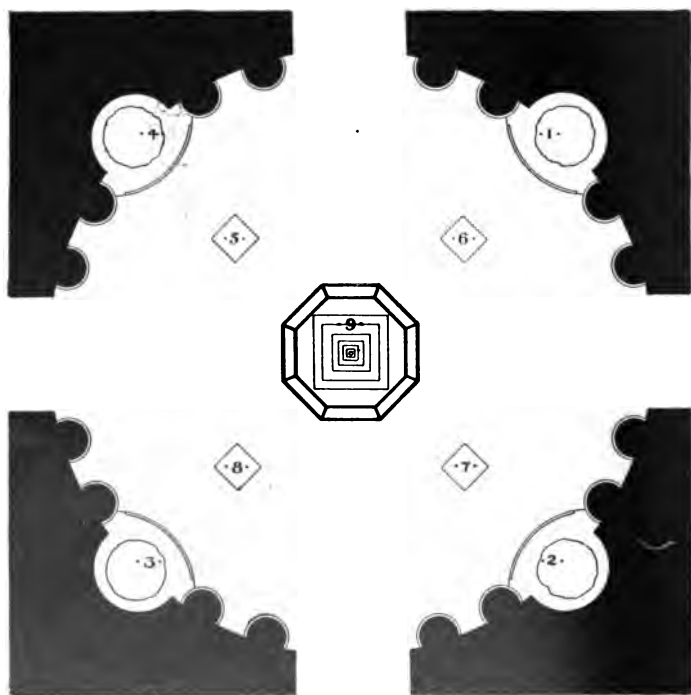
Q. Zinc-lead ore, France.

R. A tall pyramid of oxidized iron ore, from Greece, and numerous other specimens from different foreign and American localities at the base.

S. Hematite (red oxide of iron), Wyoming.

T. Copper ore (bornite), Cape Colony, South Africa.

U. Large mass of Calamine (zinc silicate), Arkansas. The weight of this mass is about 10,000 pounds.



PLAN OF HALL 80.



HALL 80.

WEST DOME.

Beneath the center of the dome stands a statistical column, giving the bulk of each product of the mines of the United States in 1892, for one second of time. Multiplying this by the number of seconds in the year (31,536,000) will give the annual product. This column was built according to data given by the United States Geological Survey. In the four niches are pyramids of ore, containing:

No. 1.—Gold and Silver Ores.

Gold and silver ore, State of Washington, U. S. A.

Silver ore, from New South Wales.

No. 2.—Tin Ore.

Cassiterite, or tin oxide, in micaceous schist, from New South Wales, Australia, and South Dakota, U. S. A.

No. 3.—Iron Ore.

Red Hematite, from Wyoming and Minnesota, U. S. A.

No. 4.—Copper Ores.

Bornite, from Cape Colony, South Africa.

Chalcopyrite, from New South Wales, Australia.

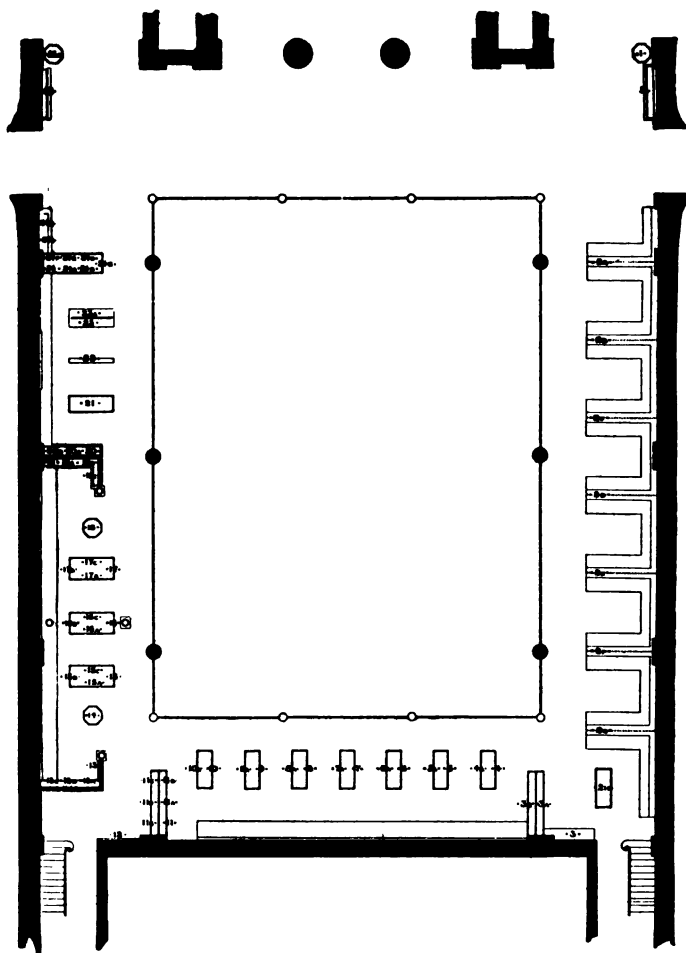
The four large specimens surrounding the column are respectively:

No. 5.—Calamine (silicate of zinc), from Arkansas.

No. 6.—Silver ore, from New South Wales, Australia.

No. 7.—Iron ore (red hematite), from Minnesota.

No. 8.—Iron Pyrite (sulphide of iron), Quebec, Canada.



PLAN OF SOUTH GALLERY.



DEPARTMENT OF BOTANY AND PLANT ECONOMICS.

This department occupies the galleries of the North, South, East (in part) and West Courts of the main building, and may be reached by any of the four flights of stairs in the central rotunda, or by the stairways at either side of the east and west main doors.

The collections of this department comprise, in the main, those of the foreign governments in forestry, as exhibited in their Government Buildings, and in the Forestry Building at the World's Columbian Exposition; the major portion of the gums, oils, medicinal plants, tan barks, dye woods, seeds and fibers exhibited by the foreign countries in the Agricultural and Manufactures Buildings; the Economic Plant Exhibit of the U. S. Government as exhibited in the Government Building, and portions of many American exhibits in this important branch of natural science.

The general arrangement of the department is as nearly geographic in character as is possible. Beginning at the southeast corner of the South Court the visitor travels westward through Russia, Corea, Japan, India, Ceylon, Johore, Siam, Turkey, Spain, and Australia; thence, beginning at the Straits of Magellan, northward through Argentine, Paraguay, Brazil, Venezuela, Trinidad, British Guiana, Ecuador, Colombia, Guatemala, and Mexico, to the United States as far as Alaska, meeting there the starting point, Russia.

The special aim in the installation of the objects in this department has been to insure scientific arrangement, although it is hoped enough display is made to attract and please the general visitor, especially when this could be done without detriment to the natural sequence of species. Sufficient time has not yet elapsed to study into the correctness of the identification labels, that were attached to the specimens when received, and

which principally have so far been retained. This is especially to be remembered by those who desire to enter into discriminative study of the collections. All the identifications will be determined by the head of this department as rapidly as is consistent with careful and systematic results, and the labeling will be corrected from time to time until accuracy shall be obtained.

GALLERIES OF THE SOUTH COURT.

Cases 1 and 1A.—The Cork Oak (*Quercus suber*) and its utilization.

Among the specimens exhibited is a very fine and costly decortication of a tree with three branches. This specimen is considered to be the best example of dextrous cork-peeling ever procured.

Cases 2A, 2B, 2C, 2D, and the wall space accompanying same, are devoted to the indigenous trees of Illinois.

Notable in this collection is a complete set of the oaks of Illinois, accompanied by water-color representations of the leaves and fruits.

Cases 2E, 2F, 2G, and the accompanying wall space, are devoted to the cultivated trees of Illinois.

Fine examples of Honey Locust, White Ash, and several species of Oak.

Case 2H.—Grains of Illinois.

RUSSIA.

Case 3.—Russian Tobacco. The first tier in this case comprises the original natural species (*Nicotiana rustica*), from which most of the finer cultivated forms have sprung. The balance of the specimens are of the variety known as Turkish leaf, from different sections of the country.

Case 3A.—Russian Flax. In this case may be found excellent specimens of dressed and undressed flax, together with the plants from which this useful fiber is obtained.

Case 3B.—Lime Tree Products. Probably the most useful tree to the Russian peasant is the Lime, or Linden (*Tilia parviflora*), from the bast layers of which many households gain the major portion of their useful appurtenances, even the structure of the dwelling itself, its floor covering and its furniture. Among the specimens will be found the natural bark, the inner layers, the fiber, both crude and macerated, matting, bags, ropes, harness, shoes, trunks, etc.

South Wall.—On the south wall platforms extending through this section will be found the principal commercial timbers of Russia, both in log and plank.

Cases 4, 5, 6, 7, 8, 9, and 10.—These cases contain the cereals and legumes of Russia.

This is probably as complete a collection of the species and varieties of the agricultural seeds of that country as can be found in any Museum in the world.

Case 11.—Turpentine industry of Russia.

This case contains the commercial products of the distillation of pine.

COREA.

Cases 11A and 11 B.—A collection of the woods, cereals, nuts, and dried fruits of this peninsula.

A comparison of the woods of this country with those of Japan, near by, will prove interesting.

JAPAN.

Cases 11C, 11D, and 11E.—The fibers, tobaccos, and teas of Japan.

Case 12.—Specimens of insects injurious to useful plants of Japan.

This beautiful and highly scientific collection showing the successive phases of insect development, as well as the injury caused by them to the plants upon which they feed was prepared

for exhibit in the Japanese section at the Exposition, but on account of lack of space was not unpacked.

Cases 13A, 13B, and 13C.—The construction timbers of Japan.

This set of specimens is particularly interesting to the student, as each wood is accompanied by a portion of the bark, and by illustrations of the foliage and fruit.

Wall.—Among the specimens here exhibited is a comprehensive series of the commercial timbers of the country in plank, square, bark, and panel. Each species is accompanied by an illustration of the foliage characteristics similar to those in connection with the construction timbers. Many specimens representing their utilization may be seen. At the south end are three native paintings showing timber operations in Japan; these are particularly interesting on account of their similarity to those carried on in this country.

Case 14.—Standard mounted with the various species of bamboo cultivated in Japan.

Originally no bamboos grew on the islands of the Japanese archipelago, where they are now cultivated to a large extent, and rendered, by husbandry processes, very straight, firm, and useful. The red and brown colorations, spots, ridges, blotches, and other beautifying marks upon these bamboos are also the result of careful and studied cultivation.

Cases 15A, 15B, and 15C.—The Cabinet Woods of Japan.

Case 16.—Minor Forest Products: Starches, Pyroligneous Acid, Fossil Boards, and Charcoal, accompanied by explanatory labels and water-color drawings.

Cases 17A, 17B, and 17C.—Minor Forest Products: Edible Mushrooms, Waxes, Lacquer, and Camphor.

In this case probably the greatest interest lies in the careful consideration of the lacquer industry, which is well represented by water-color drawings and the product itself. The same may be said of the camphor industry, which is similarly and as carefully shown.

Case 18.—Standard of Toko Posts.

The *Toko* is the ornamental place of honor in the Japanese parlor. It is here that ceremonial tea is served. This place

is dear to the heart of the Japanese hostess, and is generally furnished in the height of Japanese neatness and artistic taste. These posts are placed to support a canopy overhead, and are always of some natural unhewn wood, often decorticated, or partially so. The woods chosen for *toko* posts are generally those of high commercial value and especial rarity.

Cases 19A, 19B, and 19C.—Grains and Minor Forest Products.

In this case will be found most of the species of rice of Japan, both natural and whitened; tan barks, dyes, and fibrous barks; also the woods used in the manufacture of paper, together with paper pulp from same.

BRITISH INDIA.

Cases 20, 20A, and 20B.—The Fibers and Minor Forest Products of India.

Wall.—The wall in this section is wainscoted with various species of the commercial timbers of the country, in the center of which is a beautiful *padouk* doorway, and carved blackwood stands for jardinieres. Along this wall may also be seen blocks of Teakwood, famous as ship building material.

Case 21.—Minor Forest Products, lacs and dyes.

Stand 22.—A single piece of *padouk* board, six feet eight inches in diameter, cut in a circle, for a table top.

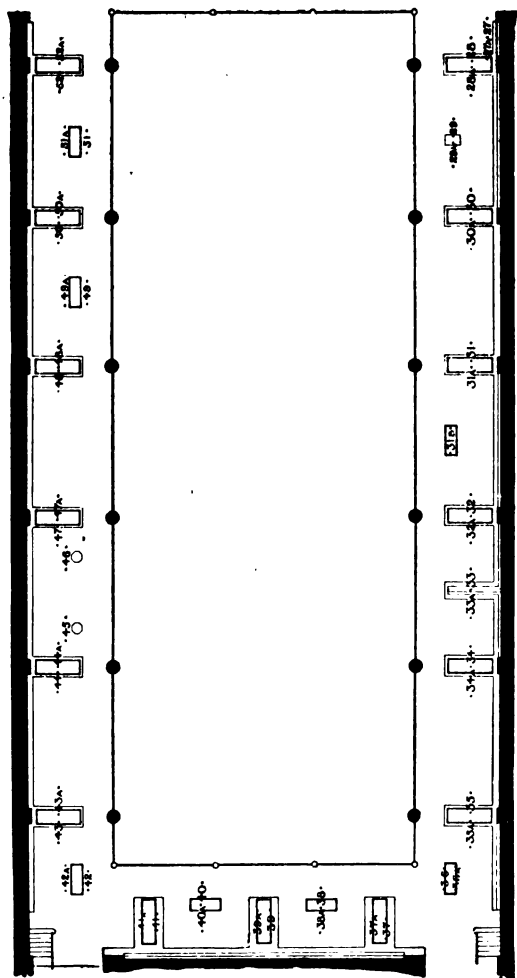
Stands 23 and 23A.—Logs of Commercial Woods.

Notable among which are satin-wood and sandal-wood. Photographs of teak plantations and the cutch industry.

CEYLON.

Cases 24A and 24B.—The Commercial Woods of Ceylon.

This case also contains many Ceylon products, both of forest and field. Starches, oils, gums, etc.



PLAN OF WEST GALLERY.

JOHORE.

Cases 24C, 24D, 24E, 24F, 24G, and 24H.—The woods of Johore, both commercial and non-commercial, together with the minor forest products of the country.

Notable in this case is anatto seed, oil, and paste, so greatly used in the United States in the coloration of butter.

Case 25.—The Rattans and Medicinal Plants of Johore.

Standard 25A.—The Commercial Rattans of Johore.

GALLERIES OF THE WEST COURT.

SIAM.

Case 26.—Siamese Plant Economics. Many curious and noteworthy products are represented, among which will be found gamboge, spiral and zig-zag bamboo, and edible bird's-nests.

TURKEY.

Case 27.—The Woods of Turkey. Even the casual observer will note here the striking resemblance between these woods and those of our own country; particularly is this true of the pine, cedar, oak, ash, cherry, and sycamore.

SPAIN.

Case 27A.—The Woods of Spain.

Case 28.—Economic Plant Products. Especially interesting is the large comparative collection of olive oils, representing the product of various provinces.

LIBERIA.

Case 28A.—Minor Forest Products.

NEW SOUTH WALES.

Wall and Standard 29 and 29A.—The principal timbers of the country. exhibiting excellent specimens of their cedar rosewood, beech, and several species of Eucalyptus or gum.

SOUTH SEA ISLANDS.

Case 30.—Sea Fruits.

This designation is given to various odd and curiously shaped fruits, that sailors, particularly those attached to whaling vessels and others gather upon the beaches of the Pacific Islands, where they have been cast by the waves. The most notable among these fruits is the "Coca de Mer," the largest known fruit tree, curious both on account of its shape and size.

PARAGUAY.

Case 30A.—*Maté* or *Yerba*. Paraguay Tea.

The source of *Maté*, the principal drink of South America, is the roasted and powdered younger leaves and twigs of a forest tree belonging to the Holly family.

The beverage is prepared in the same manner as tea is "drawn," and is drunk in hot infusion. Great care is taken, however, to thoroughly strain the liquor, in order that no portion of the powder shall be swallowed. Properly prepared *Maté* forms a pleasant and slightly stimulating morning drink, which may be taken clear, or with sugar or milk, or both.

Platforms.—Upon the platforms of the three Sections devoted to this country may be found an excellent collection of its principal timbers, the largest and most complete in existence; notable species

are *Lignum Vitæ*, *Incense Cedar*, *Quebracho*, and a particularly fine specimen of *Orange Mulberry*.

A complete collection of dyeing and tanning barks, fiber plants, charcoals, and curious llanos may be seen upon the shelves and walls.

Cases 31 and 31A.—Medicinal Plants of Paraguay.

Cases 31B and 31C.—Fiber Plants. This collection is particularly rich in *Bromeliads*.

Cases 32 and 32A.—Economic and Medicinal Plants.

Cases 34.—Paraguayan Seeds, Cereals, and Oils.

BRAZIL.

Case 34A.—The Woods of Santa Catharina and Espiritu Santo.

Though the specimens in these collections are small they represent a very complete and highly valuable series, and are especially useful for study, and comparison with the other states of Brazil.

Walls and Center-piece.—Commercial Woods of Brazil.

The colorforms of the Brazilian "Pine" (*Araucaria*) here exhibited compare well with the highly useful forms of *Cryptomeria* of Japan—forms, it is true, that are due to diseased conditions, but highly ornamental and useful. The beautiful *Pao Amarello* can not fail to attract and please. This species will doubtless be largely exported in the future, as it has attracted very favorable notice here.

Case 35.—The Woods of Pernambuco.

Case 35A.—Woods of Ceará.

Wall.—The Woods of Paraná.

This set is one of the most complete and uniform wood collections sent here from this country, and represents a large outlay of time and money.

Cases 36 and 36A.—Bast Fibers.

Notable in this case is the wonderful "natural oakum," a bast that requires but slight preparation to fit it for the calking iron.

West Wall.—The Woods of Minas Geraes and Para.

A large and valuable set of trunk specimens, notable among which are rosewood, snakewood, violet, and the indispensable Brazilian cedar.

Cases 37 and 37A.—Medicinal Plants.

Brazil is especially rich in medicinal plants. It is from this country that many of our most useful plant medicines are derived; notably, sarsaparilla and copaiva.

Cases 38 and 38A.—Rubber.

The principal product of Brazil, next to coffee and sugar, is the so-called India Rubber, for which the Amazon and its tributaries are noted. Seventy-five per cent. of the product is exported to the United States. Nearly all forms of the raw material may be seen in the collection.

Cases 39 and 39A.—Medicinal plants, and oils.

Cases 40 and 40A.—Textile Fibers.

This collection is particularly rich in Palm products.

Cases 41 and 41A.—Gums, Resins, Seeds, and Cereals.

North Wall.—The Woods of Maranhao.

ECUADOR.

Cases 42 and 42A.—Ecuador Products.

Case 43.—Seeds, gums and Medical Plants.

COLOMBIA.

Case 43A.—Minor Forest Products.

Wall—A series of Colombian Woods.

VENEZUELA.

Wall.—Woods.

This collection, though composed mostly of small specimens, is particularly valuable in that nearly all of the species are authentically identified. It is also a quite complete series, and one of great scientific value.

Case 44.—Fibers, cottons, cereals, and barks.

BRITISH GUIANA.

Case 44A.—Gums, oils, starches, and *Cassava* bread.

Wall.—The Woods of British Guiana.

This collection contains many richly colored and valuable timbers, among which the *wallaba* green heart, purple heart, and mahogany are especially deserving of careful comparison with the cabinet timbers of any country.

TRINIDAD.

Wall.—The woods of Trinidad excited the most favorable notice of any displayed at the Exposition, both for their beautiful markings, and high permanent color. The magnificent *Saman*, or leopard mahogany, was by far the finest specimen in the Forestry Building, while the *angelin* and purple heart were wonderful examples of high color in wood. This collection forms one of the brightest color spots in the galleries.

CURAÇAO.

Case 47.—Economic Plants and Fruits.

GUATEMALA.

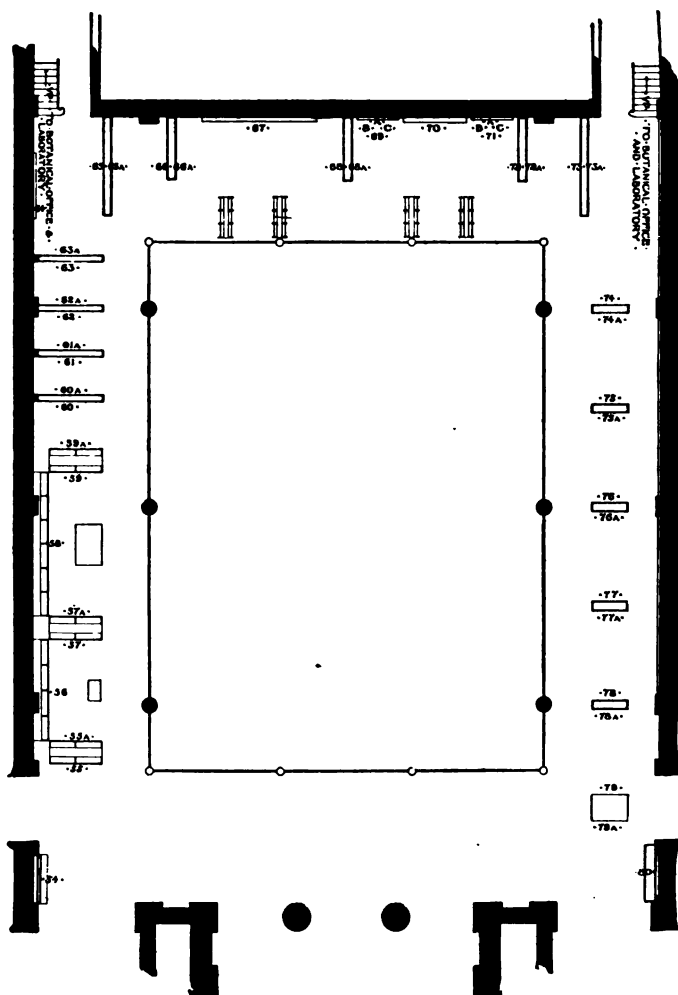
Case 47A.—Cereals, and legumes.

Wall.—The Woods of Guatemala.

Cases 47B and 47C.—Fibers and Cottons.

Case 48.—Guatamalan Forest Products.

Case 48A.—Cereals, legumes, gums and resins. *Chicle* from the juice of the *sapote* tree, the base of most modern chewing gums, may be seen here and in Case 52.



PLAN OF NORTH GALLERY.

JAMAICA.

This collection is particularly rich in starches—Arrow-root, mandioca, and banana meal being excellently represented.

Wall.—The Woods of Jamaica.

An excellent and very complete collection of the principal woods of the Island.

MEXICO.

Cases 50 and 50A.—Mexican seeds, cereals, gums and oils.

Wall.—This space is designed for the timbers of Mexico, of which the museum secured a large and complete set, now in preparation for installation.

Cases 51 and 51A.—Mexican textiles.

Cases 52 and 52A.—Medicinal plants of Mexico.

DESTRUCTIVE DISTILLATION OF WOOD.

Case 53.—Monographic set. This set includes almost all of the products of the destructive distillation of the beech and birch; notable among which are creosote, acetic acid, methyl alcohol, benzol, benzene, and oil of birch.

GALLERIES OF THE NORTH COURT.

Case 54.—Insects injurious to the paper pulp tree. A complete and very interesting monographic collection of the insect enemies of the spruce tree of Europe, showing the mutations of each species, and examples of the injury wrought by them.

ECONOMIC PLANTS.

Cases 55 to 59A.—Tobacco. These cases contain nearly four hundred samples of American grown tobaccos, from almost every producing district of the United States. A very complete and highly important comparative collection, both from the standpoint of the student and the merchant.

COTTONS.

Case 60.—Texas and Arkansas cottons.

Case 60A.—Arkansas and Tennessee cottons.

Case 61.—Mississippi and Louisiana cottons.

Case 61A.—Louisiana and Texas cottons.

Case 62.—Virginia and North Carolina cottons.

Case 62A.—Georgia and South Carolina cottons.

Case 63.—Georgia cottons.

Case 63A.—Alabama and Mississippi cottons.

Case 64.—Georgia, Florida, Oklahoma, Tennessee and Missouri cottons.

FIBERS.

Case 65.—Ramie.

Case 65A.—*Abutilon*, Okra, *Asclepias*, and Indian hemp.

Case 66.—Manila Hemp, Ixtle and *Yuca*.

Case 66A.—Bow String Hemp, Saw and Cabbage Palmetto.

Case 67.—Flax plants.

Case 68.—Florida Sisal.

Case 68A.—Mexican Sisal, False Sisal.

Case 69A.—New Zealand Flax.

Case 69B.—Louisiana Cane Fiber.

Case 69C.—Pineapple Fiber.

Case 70.—Spanish Moss, Cypress Bark, Raphia, and Grass.

Case 71A.—Intermixed Ramie and Silk.

Case 71B.—Dressed Flax.

Case 71C.—Ramie Yarns, natural and dyed.

Case 72.—Saw Palmetto and African Fiber.

Case 72A.—Cocoanut and Pine-Needle Fibers.

Case 73 and 73A.—Dressed and undressed Flax.

SYLVA OF THE UNITED STATES.

West Wall.—A nearly complete collection of the Leaves, Fruits, and Woods of the trees of our country, accompanied by graphic maps showing the distribution of each species. This fine collection is arranged systematically, and affords an excellent opportunity for comparison between allied woods. The richness of our sylva in oaks and conifers is strikingly exemplified.

Cases 74 to 78A.—A set of twenty monographs of North American trees. Each species in this set is illustrated by a large distribution map; photo-micrographs of three sections of the wood, horizontal, tangential, and radial; a branch in full leaf and fruit; macroscopic sections of the wood in three planes, and a section of trunk showing the bark.

Standards 79 and 79A.—Specimens of pine, showing the method of tapping for turpentine.

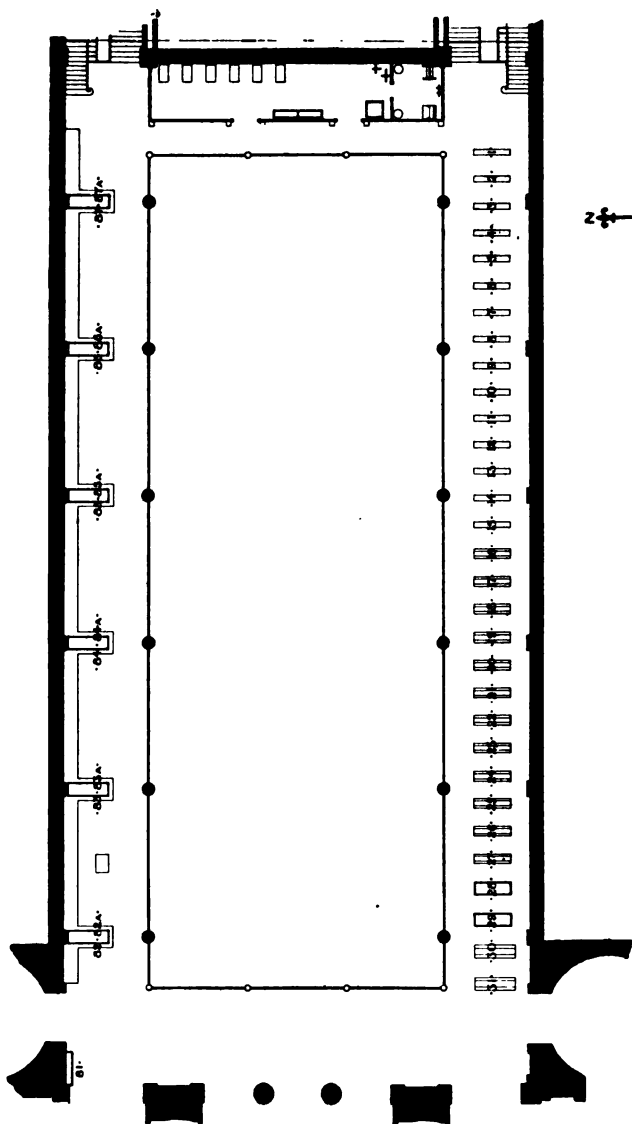
Case 80.—Indurated fiber ware. Examples, crude and finished, of the method of converting spruce wood into various household articles.

GALLERIES OF THE EAST COURT.

These galleries, now temporarily occupied by a miscellaneous collection in forestry, and a portion of the anthropological collection, are reserved for a complete forestry and economic plant collection of North America, to be specially made by this department. The various home forestry collections exhibited at the Exposition that were obtainable by the Museum were mostly of a more or less heterogeneous character as to shape and size, and of an ephemeral nature, as they were gathered while the sap was in the pores of the wood, and had commenced to decay in large part before the end of the Fair. For these reasons a few especially fine or rare specimens only were retained, which will be found upon the platforms along the North wall.

Case 81.—Paper pulp. Crude and partially manufactured specimens, showing the utilization of spruce wood, in the manufacture of all grades of paper.

Tree Planter.—A model of an extremely ingenious implement, devised by Mr. Fernow, Chief Forester of the United States, and adapted to tree-planting upon large areas.



PLAN OF EAST GALLERY.

Cases 82 and 83 and Walls.—Timber tests. Standards representing the results of strain upon various species of American timbers.

Between **Cases 83 and 84** may be seen the two broadest boards ever sawn, both being specimens of the sugar pine of California. Here also are exhibited several fine examples of plain and curly yellow poplar from Kentucky.

Between **Cases 84 and 85** various species of trees from Kentucky, Washington, Oregon, and California may be seen. Notable among these are particularly large sections of madroña, beech, pecan, and sweet gum.

Between **Cases 85 and 86** are several excellent specimens of the commercial woods of Canada, notable among them the paper birch.

Between **Cases 86 and 87**, British Columbia woods, represented by several especially fine sections. Beyond Case 87, at the end of the Section, may be seen four excellent examples of the principal timber trees of Alaska.

OF SPECIAL INTEREST.

The Bamboos. Southwest Rotunda stairway.

The Cork Tree. Northeast corner of South Court galleries.

The Japan collection. Southwest end of South Court galleries.

The collection of Teak, Sandal Wood, and Padouk in the British Indian section, South Court galleries.

The Paraguayan collection. South gallery in West Court.

The woods of British Guiana and Trinidad. North gallery of West Court.

The Insect collection. Southwest corner of North Court galleries.

The Tobacco, Cotton, and Fiber collection. In North Court gallery.

The type species and marine plants, in the standards along the rail of the North gallery, North Court. Here may be seen a close form relationship of vegetable to animal life.

The wide boards and immense beech, in the North gallery of the East Court.

DEPARTMENT OF ZOOLOGY.

The collections of the Department of Zoology are very extensive, covering fully this field of science from *Protozoa* to man.

The classification begins with the lowest forms of life, in Hall 24, and follows in ascending scale through the halls in serial order. The sequence of halls may be tabulated as follows :

Hall 24. Lower Invertebrates.

Hall 25. Higher Invertebrates.

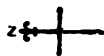
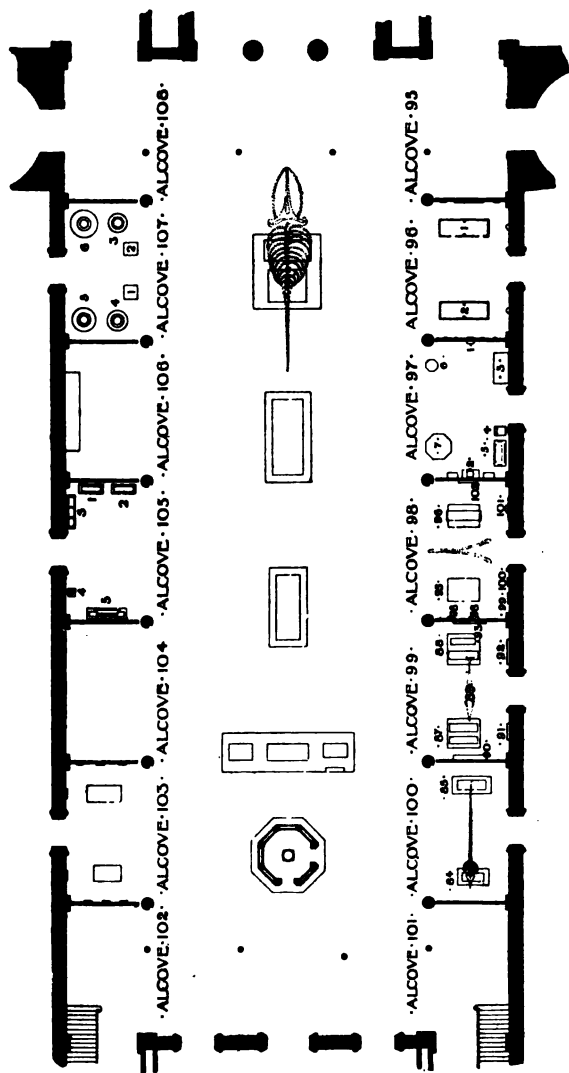
Hall 26. Ornithology.

Hall 27. Osteology.

Hall 20. Systematic Collection of Vertebrata.

The collections of Aves properly belongs, in the classification, between the Reptilia, in case 61, and the Order Monotremata, of the Mammalia, in case 62, A. The collections are especially rich in several divisions, as for example: the *Sub-kingdom Mollusca*, in which is nearly every family, genus and sub-genus, at present described; also the collection of corals (*Sub-kingdom Calenterata*) which is unusually rich in species of great interest. The Osteological collection is one of great value, and contains many very rare specimens.

The classification adopted is essentially that of the best German and French *savants*, with such additions as modern American investigations have made necessary.



PLAN OF WEST COURT.

ALCOVE 98.

95.—Walrus.

96.—Rhinoceros skeleton.

97.—Jaws of Sperm Whale.

98A and B.—Skin and skeleton of Harbor Seal.

99 and 100.—Two varieties of fur-bearing Seal.

101.—A fine specimen of the Leatherback Turtle.

102.—Sea Elephant.

ALCOVE 99.

87.—Male and female Moose.

88.—Male and female Elk.

89.—Model of Sowerby's Whale.

90.—Giant Crab, the largest living crab.

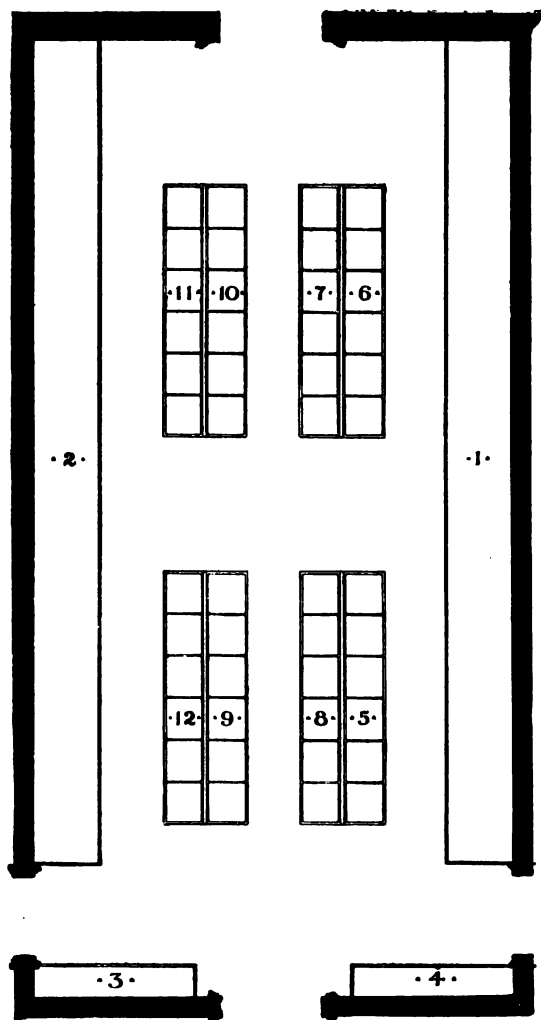
91 and 92.—Leatherback and Carey Turtles, of very large size.

93.—Alligator, from Lake Worth, Florida.

ALCOVE 100.

84 and 85—Mounted skin and skeleton of the Giraffe. The skeleton measures thirteen feet in height from the floor to the tip of the horns.

86.—Suspended over the doorway, a large skeleton of the Bottle Nose Whale, from the North Sea.



PLAN OF HALL 24.



HALL 24.

LOWER INVERTEBRATES.

Entering from Hall 23.

Case 1.—A collection of models of the simplest forms of animal life (*Branch I,—Protozoa*), commonly known as animalcules. These are magnified 2,300 times, and are faithful representations of these curious animals. Just below a collection of sponges (*Branch II,—Porifera*), among which are the curious Neptune's Cup, the Glass-rope Sponge, and the Venus Flower-basket.

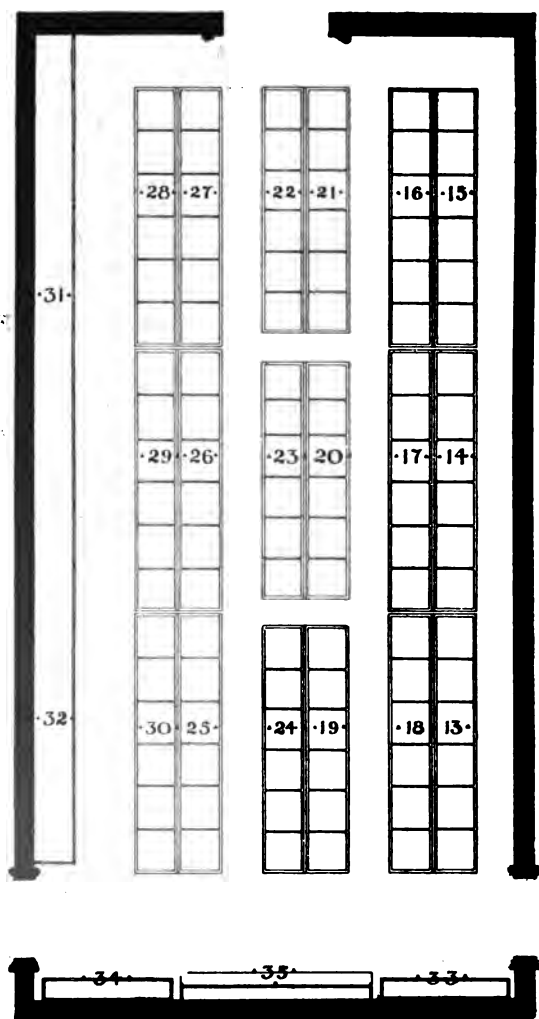
To the left of the sponges are the corals (*Branch III,—Cæ-lenterata*), those beautiful creatures which have been instrumental in building many of the islands in the tropical seas. Among these are a number of glass models of jelly-fish, the Portuguese Man-of-War, and several sea-anemones. Of great interest among these models are the two groups of sea-anemones at the back of Case 1.

Case 2, on the opposite side of the Hall.—A continuation of the corals. In the left hand side of this case is a fine collection of sea-fans and sea-plumes (*Alcyonaria*), those flowers of the sea. Among these as of special interest is the large specimen of the Tree Gorgonia (*Paragorgia*), which grows to a height of fifteen or twenty feet.

Table-Case 5 contains the first class of the star-fishes (*Echinodermata*), the Crinoids, or sea-lilies, beautiful animals mounted upon a pedicel or stalk, the Ophiurians, or serpent-stars, and the Astrophytons, or basket-fish. These last receive their name from their peculiar habit of curling into the form of a basket when taken from the water.

Cases 6, 7, and 8.—The typical star-fishes, the five-fingers so familiar to every one. In Case 7 are seen several examples of the repairing of broken arms in this family. In Case 8 the spiny-stars (*Acanthaster*) show to what peculiar modifications these curious animals are subject.

Cases 9, 10, 11, and 12.—The Echinoids, or sea-urchins. Many of these have been dredged at great depths. In the left hand side of Case 10 is seen the large Edible Urchin (*Echinus*



PLAN OF HALL 25.

esculentus) which is used for food in France. Cases 11 and 12 contain the key-hole urchins and sand-dollars, curious flat animals of very peculiar growth. In Case 12 are seen the Holothurians, or sea-cucumbers, which the people of the Celestial Empire use as food. The latter part of Case 12 is devoted to the collection of Worms (*Branch IV*;—*Vermes*), of which the most peculiar are the glass model of *Serpula* and the Bryozoans, or moss animals.

Case 4.—Several star-fishes of unusual size. Of especial interest is the group of urchins (*Strongylocentrotus*), showing the manner in which these curious animals live.

Case 3.—Principally an alcoholic collection of star-fishes, sea-urchins, and sea-cucumbers. Of especial interest are the three specimens of the sea-lily (*Pentacrinus*) in alcohol, and the wax model of the devil-fish (*Eledone*).

Suspended over the table-cases is a life-sized model of the largest known Octopus, or devil-fish.

HALL 25.

HIGHER INVERTEBRATES.

Entrance from Hall 24.

Case 13.—The last order of the Worms, the *Brachiopods*, or lamp-shells. Following these is the first order of the *Sub-kingdom Mollusca*. The collection begins with the lowest forms of these animals, known as clams. Of special interest in this case are pieces of wood bored by the Ship-worm, or *Teredo*, and a piece of massive stone pierced by the *Pholas*. At the right hand end of this case is seen a clam with its siphon or snout fully extended.

Case 14.—Collection of round-clams, or quahaugs.

Case 15.—Collection of the fresh-water clams of the United States, with a few representatives from foreign countries. Of especial interest are the fresh-water clams from Japan, showing the manner of artificially producing pearls.

Case 16.—Continuation of the fresh-water clams and the mussel family. Note the glove, cap, and muff made from the bissus of the *Pinna*.

Case 17.—A fine collection of *Avicula*, or pearl oysters, among which are the four beautiful carvings of extreme beauty from Taranto, Italy.

Case 18.—Various members of the oyster family, the elephant-tooth shells, the *Chitons*, or coat-of-mail shells, and the *Patellas*, or limpets. In the left hand end of this case is a specimen of oyster which was found attached to the back of a land tortoise.

Cases 19, 20, and 21.—Various groups of the univalves. Note especially the *Trochus*, or top-shells, the *Haliotis*, or ear-shells (19), the *Natica*, or moon-shells (20), and the *Vermetus*, or worm-shells (21).

Cases 22 and 23.—*Cypræas*, or cowrys, and the *Cassis*, or helmet-shells.

Case 24.—Collection of *Murex*, or rock-shell, among which are many beautiful examples of this rare family. At the right end of the case is a fine collection of the *Buccinum*, or whelks,—hardy shells from the North Sea.

Cases 25 and 26.—Collections of *Volutes*, or bat-shells and *Olivas*, or olive-shells. The ends of Cases 26 and 27 are devoted to the collections of the family of *Cones*, among which are several rare examples of this beautiful family.

Case 27.—Mostly collections of the sea-slugs (*Nudibranchiata*), represented by a large number of beautiful glass models and colored drawings made from the living animals.

Cases 28 and 29.—A large collection of land shells.

Case 30.—Collection of *Cephalopods*, or devil-fishes, represented by many beautiful glass models and colored drawings. Of especial interest is the set of Paper Nautilus, showing the female, the male, and the shell; also a model of the animal and shell of the Pearly Nautilus.

Case 33.—Collection of devil-fishes in alcohol. Of unusual interest is the alcoholic specimen of the Pearly Nautilus, with the animal placed *in situ* in the shell.

Case 34.—A number of shells of extraordinary size.

Case 31.—Collection of crabs and sea-spiders (*Crustacea*). Of especial interest are large specimens of the lobster, the horse-shoe group, and the shrimp.

Case 32.—A collection of 2,000 species of butterflies (*Lepi-*

doptera). Note the large metallic-blue moths from South America, and the beautiful hawk-moths from the United States and Europe.

Case 35.—Collection of photographs of microscopic slides, showing injected specimens of the tongue, ear, muscles, etc.

Suspended over the table-cases is a life-size model of a large squid. The original was found off the coast of Newfoundland in 1876.

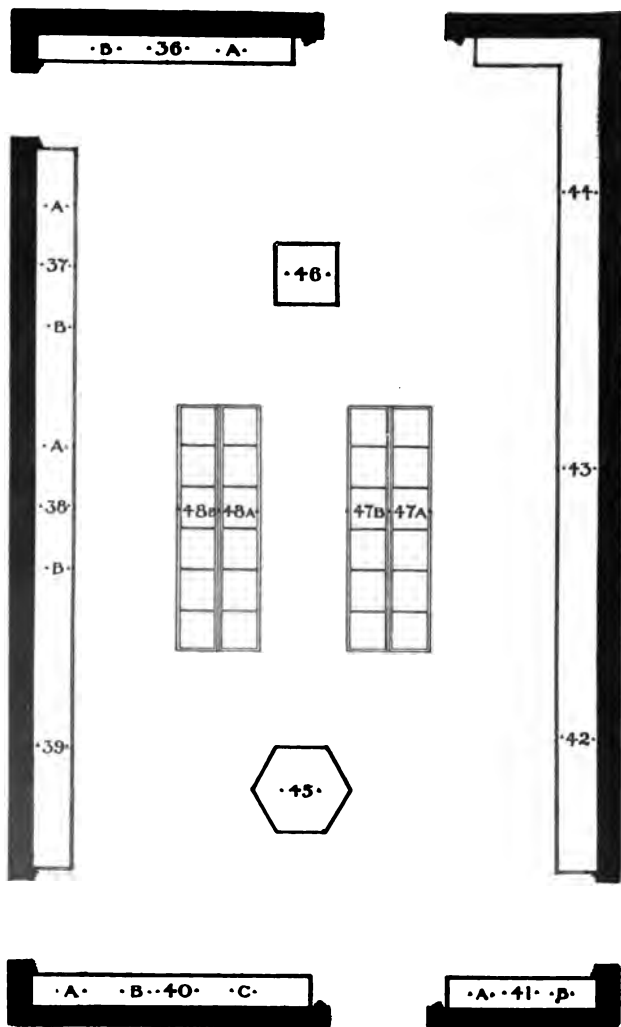
OF SPECIAL INTEREST.

The collection of the Mollusca is one of great value to the student, inasmuch as it is arranged with strict regard to the most recent classification. The larger classes, orders, etc., are explained upon tablets, giving the characteristics of each group. The especial value of the collection is not the number of individual specimens it contains, but the large number of genera and subgenera represented, making the collection as a whole an excellent manual of Malacology. Under the class Pteropoda (case 30) are shown the peculiar mollusks which form the principal food of the Right Whale, to be seen in the West Court.

The beautiful collection of glass models in this sub-kingdom is of particular excellence.

The collection of Lepidoptera is also one of great value, the collection numbering 2,000 species. It is one of the largest collections of this order in the United States.

To the right of the Butterflies is a fine specimen of the South American Lantern Fly, which emits a light so powerful that its description has been written by the sole aid of this light.



PLAN OF HALL 26.

HALL 26.

ORNITHOLOGY.

Entering from the west court.

Case 36A.—*Sub-class Ratitae*, represented by the ostrich, emu, Kiwi Kiwi, and apteryx.

Case 36B.—The *Order Pygopodes* (diving birds), consisting of the penguins, auks, puffins, grebes, and loons.

Case 37A.—The *Order Longipennes* (long-winged swimmers), represented by the petrel, gull, and terns.

Case 37B.—The *Order Stegopodes* (Totipalmate birds), comprising the frigate-bird, snake-bird, cormorants, pelicans, and gannets.

Case 38A.—The *Order Lamellirosteres*, represented by the duck, geese, mergansers, and swans.

Case 38B.—The *Order Grallatores* (wading birds), represented by the cranes, rails, herons, snipe, plover, curlew, and gallinules.

Case 39.—The *Order Gallinae* (gallinaceous birds), comprising the partridge, quail, ptarmigan, grouse, turkey, and guinea hens.

Case 40B.—The *Order Columbæ* (doves, etc.), represented by the pigeons and doves.

Case 40C and 41A.—The *Order Raptores* (raptorial birds), represented by the buzzards, vultures, falcons, hawks, eagles, and owls.

Case 41B.—The *Order Psittaci*, represented by the parrots and paroquets.

Case 42.—The *Order Picariae* (woodpeckers), comprising the woodpeckers, cuckoos, swifts, humming-birds, horn-bills, kingfishers, and toucans.

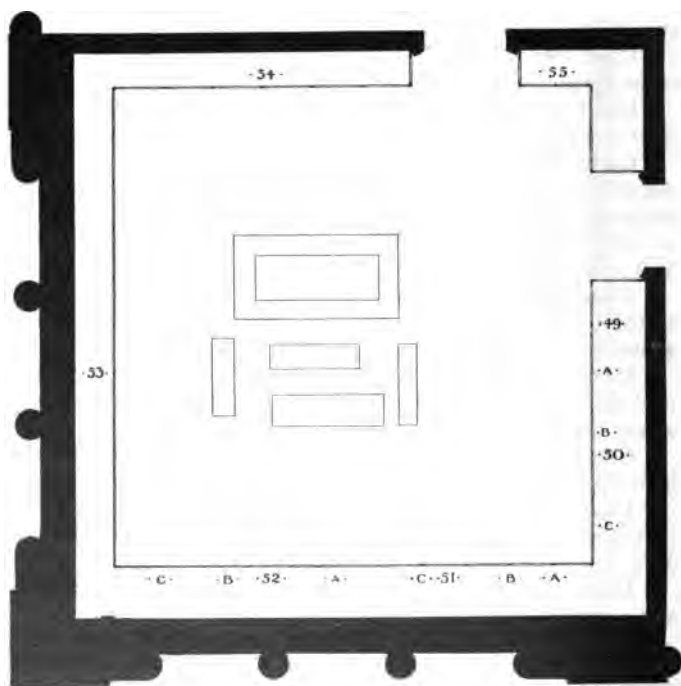
Cases 43 and 44.—The *Order Passeres* (perching birds), comprising the magpie, fly-catchers, pewees, lyre-bird, crow, black-bird, birds of paradise, oriole, bobolink, song-sparrow, warblers, and robins.

Case 46.—A group consisting of the ostrich, young and egg.

Case 45.—A group consisting of large cranes and herons. Horn-bill in nest on top of case.

Case 47.—A collection of North American and foreign eggs,

Case 48.—A collection of North American bird skins.



PLAN OF HALL 27.



HALL 27.

OSTEOLOGY.

Entrance from Hall 20.

Case 49.—Fishes (*Class Pisces*), among which are the mud-fish, gar-pike, shark, and perch.

Case 50A.—(The floor.) The Batrachians (*Class Batrachia*), among which are salamanders and frogs.

Case 50B.—Reptiles (*Class Reptilia*), among which are the python, gavial, alligator, carey, iguana, and a fine series of turtles.

Cases 50C and 51A.—Birds (*Class Aves*) consisting of the ostrich, emu, crane, parrot, pelican, spoonbill, pigeon, peacock, etc.

Case 51B.—The first order of the Mammalia (*Order Monotremata*) represented by the Duck-billed Platypus and the Echidna; the Marsupials (*Order Marsupialia*), consisting of the kangaroo, opossum, and phalangus, and the Cetaceans (*Order Cete*), represented by the porpoise and whale.

The Edentates (*Order Bruta*), represented by the armadillo, ant-eater, and sloths.

Case 52A.—The Rodents (*Order Glires*) represented by the squirrels, rats, mice, and woodchucks.

Case 52BC.—Moles and shrews (*Order Insectivora*), the bats (*Order Chiroptera*), a few specimens of the Ungulates, and the *Order Sirenia*, represented by the Dugong.

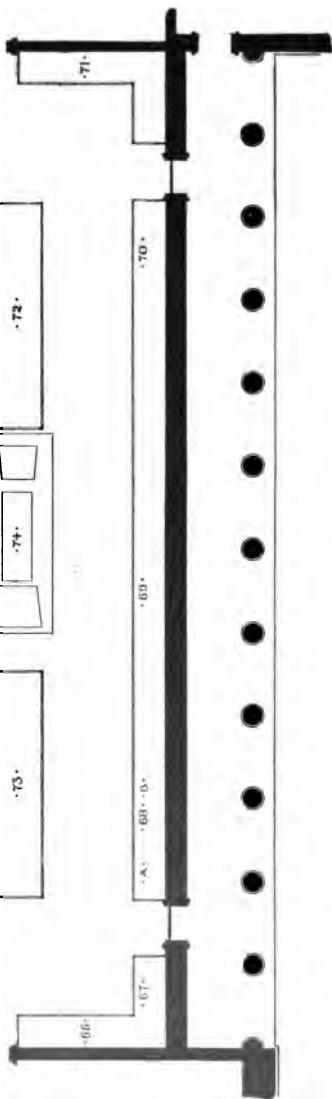
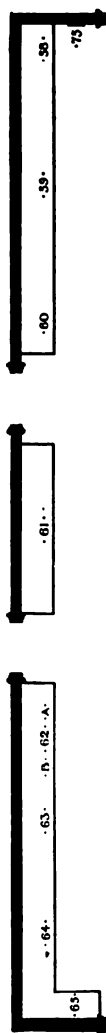
Case 53.—The Ungulates (*Order Ungulata*), represented by the deer, elk, moose, Rocky Mountain Sheep, Musk Ox, etc., etc.

Cases 54 and 55A.—The Carnivores (*Order Carnivora*), represented by the lion, tiger, bear, fox, wolf, seal, etc.

Case 55B.—The *Order Primates*, or monkeys, represented by the gorilla, chimpanzee, marmoset, etc.

Case 56.—The skeleton of the elephant on a raised platform.

Case 57.—A number of skeletons of the elk, hippopotamus, moose, etc.



PLAN OF HALL 20.

HALL 20.

VERTEBRATE ZOOLOGY.

Entrance from Hall 19.

Case 58.—First and lowest class of the Vertebrates, the *Tunicata*, or sea-squirts, represented by several beautiful glass models. In the same case, on the next shelf above, is a single representation of the class *Marsipobranchii*, the Lamprey.

Cases 58 and 59.—The first group of true fishes (*Class Pisces*), the sub-class *Elasmobranchii*, or sharks and rays. Among the more important members of this group are the Hammer-head Shark and the specimen of the torpedo.

Case 60.—In this Case are the two remaining sub-classes of Pisces (*Ganoidea* and *Teleostei*), among which are found the Electric Eel from the Orinoco River, a large gar-pike, several specimens of perch, herring, and mud-fish, and a beautiful specimen of the sword-fish. In the left hand end of Case 59 is exhibited the class *Batrachia* represented by several specimens of the salamanders.

Case 61.—The collection of Reptiles (*Class Reptilia*), consisting of lizards, snakes, turtles, and crocodiles. Of special interest are the large Indian Python, the rattle-snake, the tortoise, chameleon, iguana, and crocodile.

Case 62A.—The lowest order of Mammalia (*Order Monotremata*) represented by two specimens each of the Duckbill Platypus and the Echidna. The Duckbill is curious from the fact that it lays an egg, has webbed feet, and the bill of a duck.

Case 62B.—The Marsupials (*Order Marsupialia*) are represented by the kangaroo and the opossum. The specimen of the female kangaroo, carrying its young in its pouch, and the Virginia Opossum, carrying its young on its back, are of special interest.

Case 63.—The Order *Bruta* (*Edentata*), represented by the ant-eaters, the armadillos, and the sloths.

Case 64.—The Order *Glires* (*Rodentia*), consisting of the squirrels, rats, mice, and rabbits. Of special interest are the

groups of the common gray squirrel, the beaver, the porcupine, and the Capybara, the largest of existing rodents, pig-like in appearance.

Case 65.—The *Order Insectivora*, consisting of the moles and shrews.

Case 66.—The *Order Chiroptera* (the bats), of which the collection is unusually large.

Case 67.—The *Order Cete*, the whales and porpoises, represented by several *papier mache* models of the whale, grampus, and common porpoise.

Case 68A.—The *Order Sirenia*, represented by the Manatee and the Dugong.

Case 68B.—The *Order Ungulata*, to which the larger number of mammals belong. The order begins with the Llama and the Alpaca, two interesting animals from South America. Following these are the groups of deer and antelope. Of great interest is a beautiful pair of the rare Rocky Mountain Goat.

Case 69.—The *Order Carnivora*, containing the cat and dog families. Of special note are the group of the skunks, the otter, the panther, the fine specimens of the gray wolf and the handsome specimens of the lynx.

Case 70.—The *Order Primates*, the last and highest order of the mammalia,—the monkeys. Several fine specimens of the marmoset and many specimens of the long-tailed monkeys.

Case 71.—A collection of plaster casts of German fishes.

Case 72.—A large collection of mammals arranged in groups. Of special note are the group of the panther, consisting of male, female, and young, the large specimen of the mandrill, the gorilla, the pair of lions and tigers, the male, female, and young Grizzly Bear, and the fine specimen of the Polar Bear.

Case 73.—A number of horned animals, among which are the Rocky Mountain Sheep, the Musk Ox (a very fine specimen), and the old and young bison group.

Case 74.—In the center of the Hall, upon a raised platform, are excellent specimens of male and young elephant, sea lion, and fur seal.

On the Wall, No. 75.—Near the entrance from Hall 19 is a specimen of the gavia.

DEPARTMENT OF ANTHROPOLOGY.

The collections brought together in the Department of Anthropology are intended mainly to illustrate the more primitive or uncivilized phases of the development of the human race. There are two well marked divisions of the subject, and the materials illustrating them are separately installed. One relates to man himself, to his physical and mental constitution and powers, and the other to the works of his hands, to the visible phenomena of culture.

The first division consists of apparatus used in studying the greatly varied physical and psychical phenomena, and of extensive collections of crania casts and other objects, articles and materials, illustrating the physical characteristics of the race. These exhibits are arranged in the gallery of the East Court.

The second division comprises very extensive exhibits of the handiwork of man, which are placed on the main floor of the courts and the halls of the southeast section of the building.

The works of living or historic peoples, are for the most part assembled according to the tribe or nation to which they pertain; those of prehistoric peoples are brought together in groups, according to the locality from which they are derived, to the people, time, or stage of progress they are thought to represent, or with reference to some other special subject to be illustrated.

The various groups thus indicated are placed in the halls in an order corresponding as far as possible with their original geographic relations. In this way the various objects and articles, and through them the people represented, are conveniently studied and compared. It is also possible with this arrangement to illustrate the striking and profound effect of environment—of the local animal, vegetal and mineral resources and the varied geographic and climatic conditions upon the people and culture of each region.

Certain collective exhibits are brought together in separate rooms to illustrate special subjects, or to facilitate comparative

study in some important direction. This is exemplified in Hall 2, where numerous examples of religious art are assembled, and in the South Court which is devoted to aboriginal American sculpture.

A large portion of the collections exhibited in the Department was made for the Department of Anthropology of the World's Columbian Exposition. The completeness of this material makes it possible to illustrate the salient features of American primitive culture in prehistoric times as well as in modern times. The following regions are especially well represented through this source: Peru, Bolivia, Ecuador, Venezuela, Costa Rica, Yucatan, California, the North Pacific Coast, the Northwest Territories of Canada, Northern Alaska, Greenland, Delaware and Ohio.

The primitive culture of the Indian has disappeared rapidly during the last decade, so that at this date full collections can be made with difficulty only. The great collection of Mr. Ed. E. Ayer covers this ground quite fully, and fills a place in the Museum which would otherwise be imperfectly represented.

Recent donations from the Smithsonian Institution and the Bureau of American Ethnology include models of Pueblo villages and ancient ruins, together with numerous ancient relics and modern utensils from the Pueblo region. There are also large series of implements and objects and models illustrating the arts of quarrying and mining and the manufacture of stone implements by the Aborigines.

The collections enumerated above are supplemented by the large and valuable collection of Emilio Montes of Peru; the collections exhibited by the United States of Colombia in the Colombia Building of the World's Columbian Exposition; the Hassler collection from Paraguay; the Bruce collection from Alaska; the results of explorations conducted by the Peabody Museum in Honduras from 1891 to 1893; the Charnay collection of casts, from Central America, and the Berlin and Guatemala collections of reliefs.

Among the larger collections from foreign countries must be mentioned the Finsch collection, from New Guinea; the Peace collection, from New Caledonia; the Remenyi collections, from South Africa; and the Schahovskoy collection, from Siberia.

The Anthropological Department occupies the South Court, the southeast wing of the building, the alcoves of the East Court,

the southern series of halls of the northeast wing, the east and south galleries of the East Court, and the north alcoves of the North Court.

The South Court is devoted to large objects, mainly reproductions of Central American antiquities, and a series of Totem Poles from the North Pacific Coast.

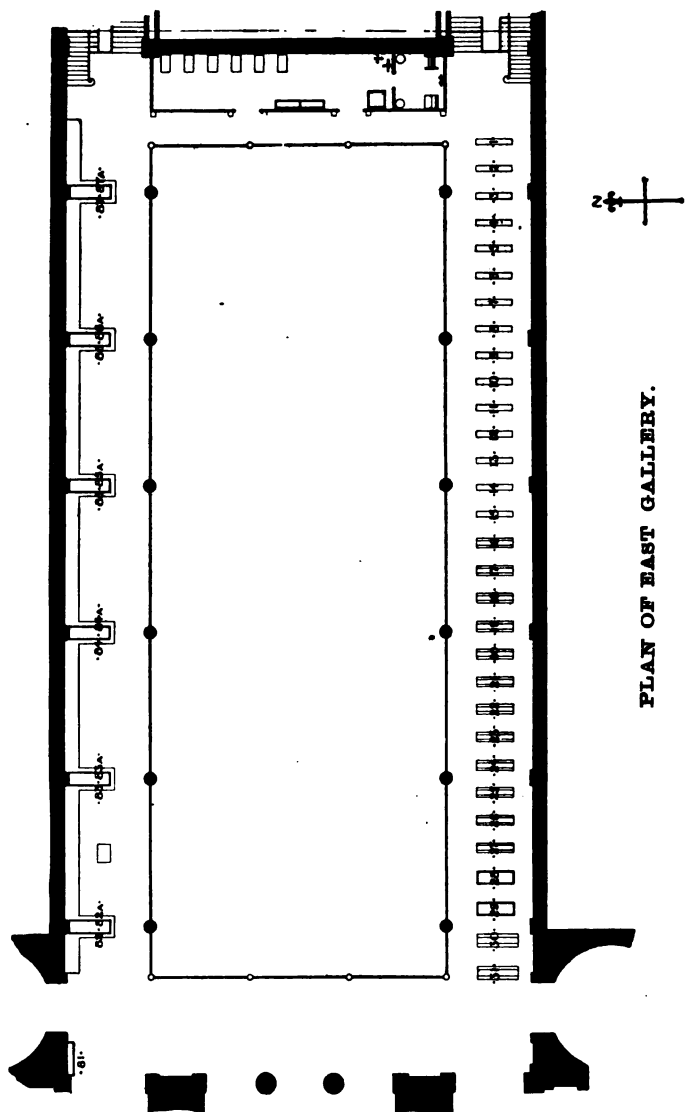
The southeast wing is devoted to the Ethnology of America. The visitor when entering Halls 10 and 11, finds himself among collections from the Alaskan Eskimo. Passing into Room 18 he encounters several cases in which are displayed articles obtained from the Eskimo of Labrador and Greenland; these are followed in turn by collections from the Indians of Alaska, the British possessions, the United States and Mexico. Halls 12 and 13 contain exhibits from the Northwest Coast, beginning at the southwest with South Alaska and ending at the northeast with the State of Washington.

Halls 14, 15, 16 and 17 are devoted to the Ethnology and Archeology of South America.

The East Court and its alcoves contain a somewhat varied group of exhibits, the larger part, however, relating to the primitive inhabitants of North America.

Hall 2 is devoted to an exhibit mainly of religious art. Hall 3 is to contain recently acquired exhibits from Egypt and the rest of the Halls on the North side are occupied by collections illustrating the Ethnology of Africa, Asia and the Pacific Islands.

Alcove 123 in the North Court contains casts of Assyrian antiquities and Alcove 122 a collection of reproductions of Irish antiquities. Other collections will be added as they are acquired.



PLAN OF EAST GALLERY.

PHYSICAL AND PSYCHICAL ANTHROPOLOGY.

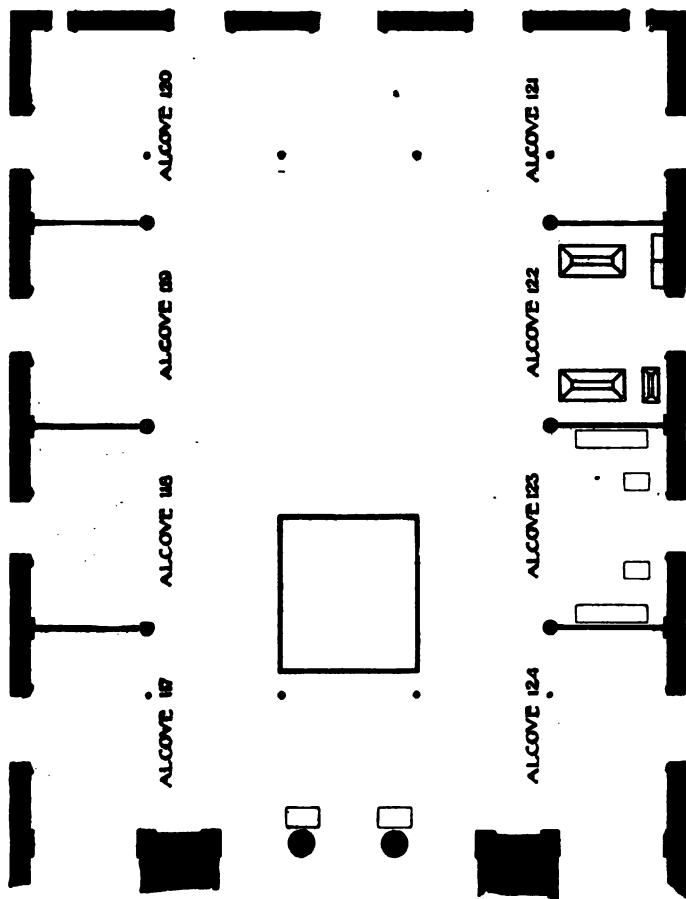
This section is situated on the east and south galleries of the East Court. On the east gallery is the Anthropometric Laboratory, in which are placed the various physical and psychological apparatus.

The object of the psychologic apparatus here exhibited is to illustrate the methods of testing the various senses, the accuracy of movements, the quickness and delicacy of perception, and the strength of other mental powers; it also serves to contribute to the accumulation of such mental measurements. Near the south end of the room are instruments for determining the delicacy of touch, of judging distances by the sense movement, of judging weights by the effort needed to raise them, of making several movements of equal extent and the like.

For the eye, tests are made of the accuracy with which the length of lines are judged and reproduced, and spaces equally divided; the accuracy of aim or coördination of eye and hand; the quickness and correctness with which closely similar marks can be distinguished. The range and clearness of vision is determined by the smallest size of certain forms and dots visible at a given distance, while the development of the color-sense is brought out by the quickness and delicacy of form and shade distinctions.

A special set of apparatus determines within 1-100 second the time needed for executing a certain movement, for responding to a sound or a touch, or a visual impression; also the time needed to distinguish between several touches, or several visual impressions, and to choose a movement according to the part of the body touched, or the number or color seen. Further experiments determine the range and accuracy of various forms of memory and the powers of association.

Such tests in addition to determining for the individual in what respects and to what degree his development and capacities differ from the average, have a scientific, an educational and a practical value that is sure to increase as the tests are more extensively introduced and their results interpreted.



PLAN OF NORTH COURT



This apparatus was obtained for the Museum and arranged by Dr. Joseph Jastrow, Professor of Psychology in the University of Wisconsin.

There are also in the same room, apparatus for illustrating the law governing the distribution of individuals in a binominal curve, and for the drawing of the outlines of the various parts of the skeleton.

In the smaller room adjoining are apparatus for taking the measurements of the body. Among the instruments here used are an adjustable table for measuring the stature, and a chain constructed on a similar principle to study the variations in the length of the trunk, at different angles of incline to the perpendicular. A notice hung in the middle panel, on the outside of the laboratory wall, will indicate the hours during which the laboratory will be open.

On the south gallery are situated cases containing the collections of crania, skeletons, etc.

NORTH COURT.

ASSYRIA, GERMANY, IRELAND.

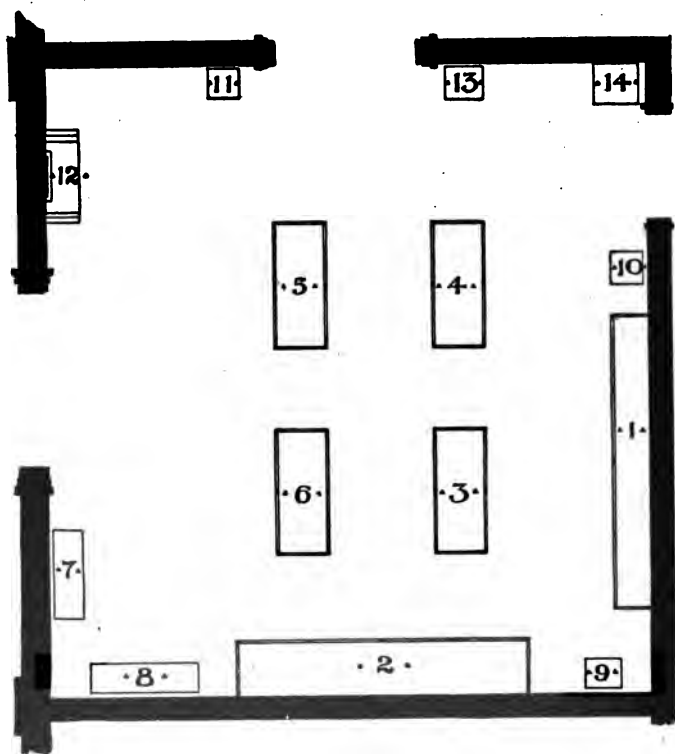
The main court is occupied by a model of the Parliament Building of the German Empire in Berlin. It is intended that a large scale model of the World's Columbian Exposition shall be introduced toward the end of the year.

Against the columns of the Rotunda at the south end are two groups of statuary in plaster, one representing "Enlightenment" and the other "The Three Virtues of Women."

Alcove 122.—Collection of reproductions of Irish antiquities, such as crosses, crosiers, shrines, and head ornaments. Collected by Mr. Edmund Johnson, of Dublin, Ireland. Four cases.

Alcove 123.—Reproductions of Assyrian antiquities; winged bull, winged lion, obelisk of Shalmanesar, the Rosetta Stone, the Moabite Stone and inscribed stone from the Temple at Jerusalem.

It is expected that other exhibits will, from time to time, be introduced into the alcoves of this court.



PLAN OF HALL 2.

HALL 2:

COLLECTION OF IDOLS AND OTHER RELIGIOUS WORKS.

This hall contains a collection of objects relating to the religious beliefs and observances of various peoples in both hemispheres. It was brought together by Mr. Wm. J. Gunning and is loaned to the Museum.

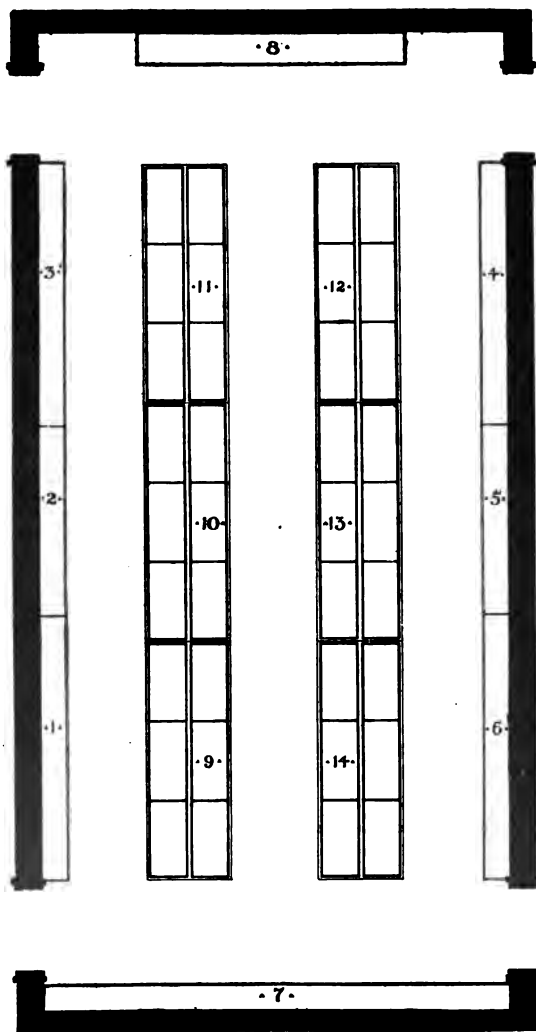
In the wall cases the Buddhistic religions of Asia are most fully represented, while the four cases occupying the floor contain much that relate to the religions of Europe, Asia, Africa, America and Oceanica.

Against the walls of the room are a number of examples of Mexican and Central American sculpture; an elaborately wrought brass incense burner from Benares, India; a bronze vase from Japan, and the model of a Japanese Buddhistic Altar.

HALL 3.

EGYPTIAN ANTIQUITIES.

Hall 3 is set aside for the display of collections from Egypt. Twenty mummies and an important series of articles in bronze, etc., have been secured. The installation will not be complete before November or December.



PLAN OF HALL 4.



HALL 4.

OCEANICA.

This hall contains the Finsch collection, the Peace collection, and portions of the Hagenbeck collection.

Case 1.—Lances, bows and arrows, shields, drums, from New Guinea.

Case 2.—Lances, paddles, masks, and wood carvings, from New Britain and New Ireland.

Case 3.—Model of a house, masks, lances, grass cloth, from New Caledonia.

Case 8.—Idols and mummy, from the New Hebrides. Image, from New Caledonia. Large dishes, from Samoa.

Case 4.—Models of houses, pottery, basketry, models of boats, New Caledonia.

Case 5.—Lances, shields, paddles, scepters, grass cloth, New Hebrides.

Case 6.—Lances, bows and arrows, clubs, grass cloth, New Hebrides. Masks and ornaments, Solomon Islands.

Case 7.—Carvings, lances, bows and arrows, paddles, clubs, cloth, Solomon Islands. Tapa, lances, bows and arrows, from various parts of the Pacific Ocean. Armor, from the Gilbert Islands.

Case 9.—Arrows, ornaments, masks, combs, stone implements, from New Guinea.

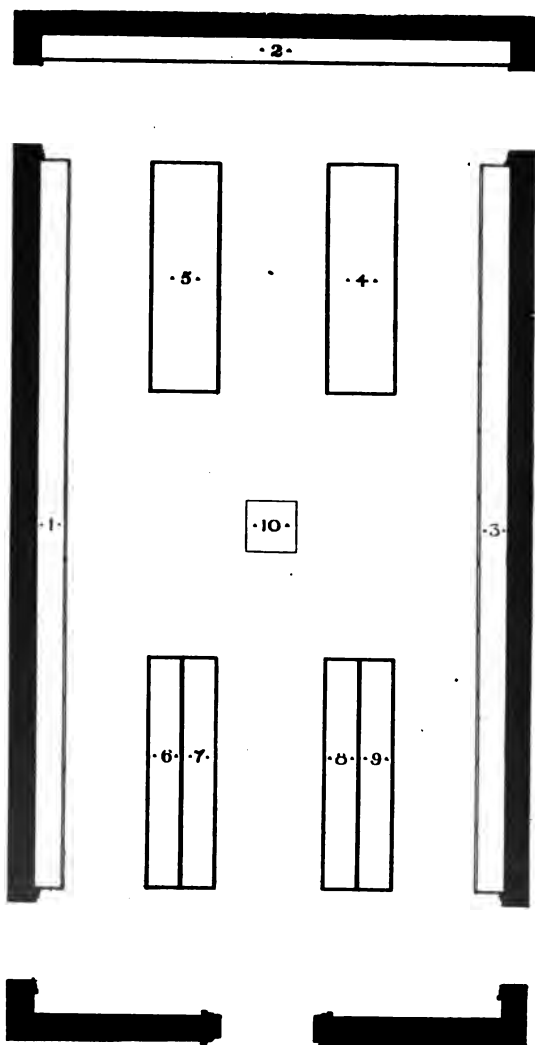
Case 10.—Amulets, stone implements, musical instruments, combs, flutes, clubs, New Britain and New Ireland.

Case 11.—Clubs, large jade axes, New Caledonia.

Case 12.—Ornaments, bead work, boar's tusks, masks, New Hebrides. Implements from Micronesia.

Case 13.—Ornaments, ropes, water vessels, clubs, fans, from Micronesia and Polynesia.

Case 14.—Lances, Admiralty Islands. Club and stone implements, from New Zealand. Lances, shields, and boomerangs, from Australia.



PLAN OF HALL 5.



HALL 6.

ASIA.

Case 1.—Siberia. In the southern end of the case, a collection of costumes, baskets, and fishing implements of the Aino of Saghalin. Costumes and baskets of Golds and Ghilyaks. Costumes of Tungus and Orochones.

Case 2.—Japanese embroidery, masks, priest's suit, armor. Corean soldier's costume. Javanese theatrical costumes, bows and arrows, quivers, Malay shields and lances.

Case 3.—Javanese theatre, set of masks, costumes, head dresses, and marionettes.

Cases 4 and 5.—Containing a set of musical instruments composing a Javanese orchestra.

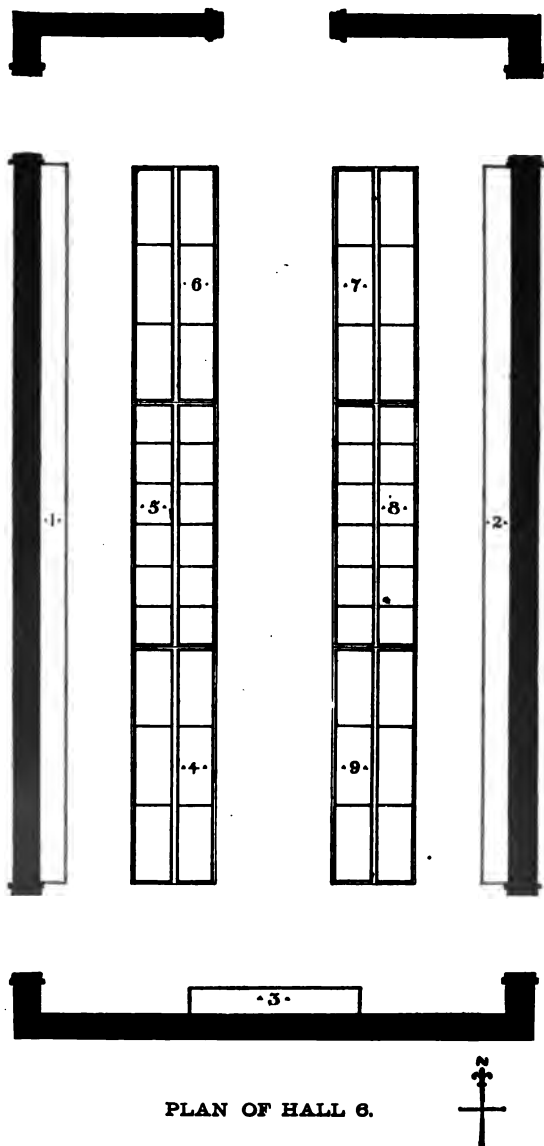
Case 6.—Ceylon: Drums, masks representing demons.

Case 7.—Singalese costumes.

Case 8.—Ceylon: Vegetable fiber, marionettes, models of vehicles.

Case 9.—East India musical instruments, brass work, pottery, and baskets of the Vedda of Ceylon.

Case 10.—Pagoda from Japan.



PLAN OF HALL 6.

HALL 6.

This hall contains the Remenyi collection, part of the Hagenbeck collection, and the collections of Messrs. Lingle and Davenport.

Case 2.—Beginning at the north end: cloths, hats, weapons and pouches from the Mandingo. Fetishes, clothing, fans, weapons, ornaments from Dahomey. Paddles, spears, gourds, and the model of a canoe from the Cameroon. Lances, cross-bows, throwing knives from Gaboon. Ornamented leather cloak from the Hottentots. Cloth, mats, hats and musical instruments from the Congo Basin.

Case 3.—Lances, shields, cloth, fetishes, from the Congo Basin. Spears, shields, dishes, milk pots and baskets from the Zulu.

Case 1.—Lances and shields from the Zulu. Cloth, waist cloth, hats, musical instruments from East Africa. Shields, hats, saddles, drums, baskets from Nubia.

Case 9.—Bracelets, necklaces, snuff boxes, pipes, and rattles of the Zulu.

Case 8.—Canes, neck rests, dishes, spoons, bead work of the Zulu.

Case 7.—Southern part: Musical instruments, fetishes, bows and arrows, swords and knives from the Congo Basin. Knives, gourds and dishes from Dahomey.

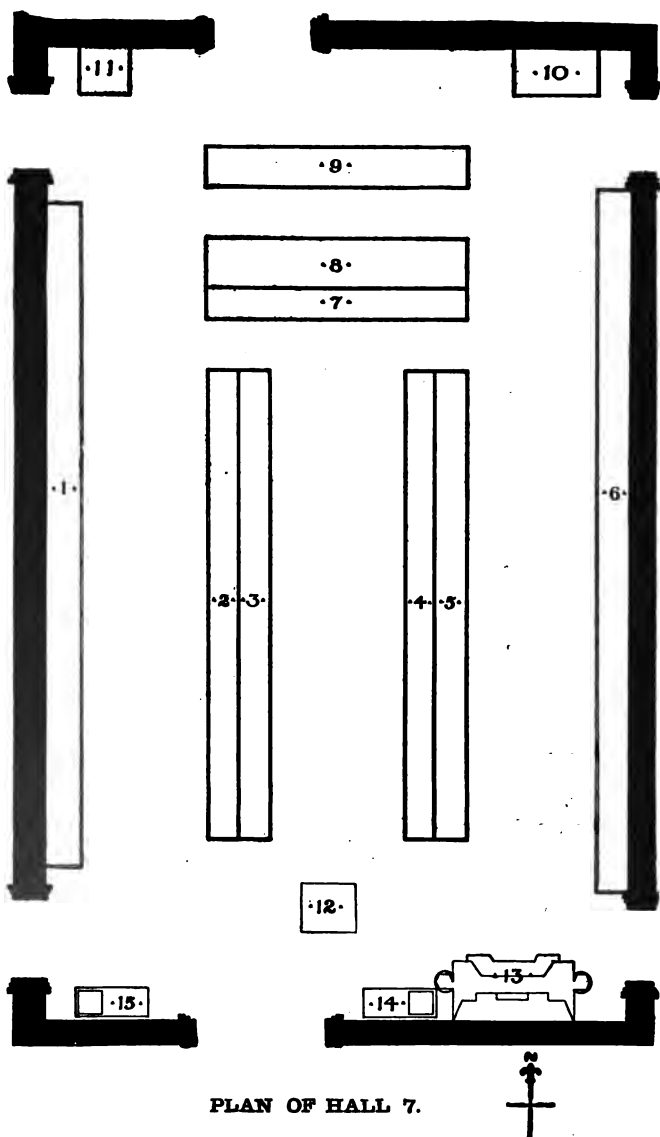
Northern part: Daggers from Java.

Case 4.—Canes and ornaments of the Zulu, fetishes, clubs, and axes.

The Northern part of the case contains ropes, pouches, musical instruments from Nubia.

Case 5.—Lances, swords, hats, sandals, basketry, from Nubia.

Case 6.—Swords and daggers from Java and Celebes.



PLAN OF HALL 7.

HALL 7.

CHINA.

NOTES FURNISHED BY MR. H. SLING, OWNER OF THE COLLECTION.

In this room are arranged the religious furniture of a Chinese Buddhistic temple. The various figures and groups of figures are intended as examples and object lessons in morality, more especially those in cases one and six.

Case 1 and 6.—The members of the Buddhistic Pantheon.

In the upper part of these two cases are shown those who, having lived an exemplary life on earth, are now being rewarded in heaven. This high distinction is obtained through canonization by the Emperor, who both declares who shall be elevated to membership in the pantheon, and over what his authority shall extend.

The Ten Courts of Justice: In the lower part of these cases are shown the Ten Courts of Justice, before which the souls of those who have infringed the Buddhistic laws of life, are tried. Here we find the punishment of a traitor, who is being roasted to death under a copper bell; the punishment of a butcher who is a heavy offender against the Buddhistic teachings, which forbids the taking of life; the punishment of a parricide, who is cut in pieces; and finally the last Court of Justice, where those who have lived a life of mere animal enjoyment are compelled as a punishment to re-enter life under the forms of animals.

Case 2.—Models of the gardens of rich families; a portrait of Confucius, the great teacher of morality; and in the south half of the case, fish baskets, frog nets, forks, rakes, harrows, plows and other farm implements.

Case 3.—Contains four tableaux of traditional events.

1.—The Emperor and his suite in a religious procession.

1a—A young Emperor, following the custom of the Imperial Family, going to worship his lately deceased father.

2.—Two generals coming before the Emperor to pray for reinforcements.

3.—A captive general being sent for by his former master escapes from his guards after a struggle and returns home, leaving his wife, who is the daughter of his captor.

Case 4.—1. The general of an army having suffered defeat, the fortunes of the day are finally retrieved by his brother, seven years of age, who comes to his assistance.

2.—A young man who has lost his father and is not able properly to bury him, sells himself to obtain the necessary money. As a reward for his piety a wife is sent him from Heaven.

3.—The Court of the Emperor who is supposed to have built the great wall of China. His wife is supposed to have been sent him from Heaven, bringing with her a magic wand, by means of which the Emperor accomplished his great undertaking. His wife finally left him and returned to Heaven, taking the wand with her, after which the Empire fell into other hands. This Emperor is also credited with having burned all the books and records in the Empire relating to events before his reign.

Case 5.—The group in the top of this case represents a Governor and his escort going to view the execution of a criminal. In the bottom of the case at the north end is a representation of a pleasure party being attacked by members of the wild tribes of North China. The remainder of the case is filled with various ornaments, including a paper dragon.

The two pictures at the south end of cases 2 and 3, and 4 and 5 represent Sam Gai Sin Shung, who is supposed to protect the house, especially from storms. These pictures are hung on outer doors throughout China.

Case 7.—Buddhistic saints.

These eight persons agreed to die together that they might be in Heaven together. After their death they appeared to the King, who canonized them under the name of the Eight Hermits.

Case 8.—3. Kwan Kung was a very wise and able general whom the Emperor canonized. He is worshipped throughout China.

2.—Is the faithful armor bearer of the former.

1.—Is the faithful Captain of the Guard of No. 3.

5.—Is the son of No. 3, and has in his hand his father's official seal.

4.—Is the God of Heaven, the highest member of the Pantheon.

6.—Is the Goddess of Peace.

Case 9.—Contains the incense burners which stand before the high altar. They are sometimes made of silver and sometimes of lead.

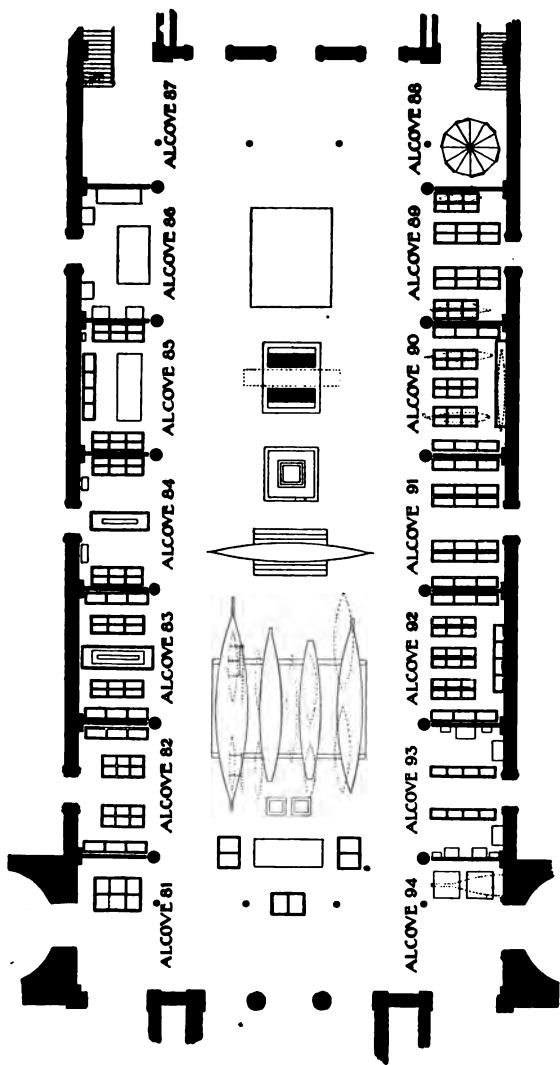
Case 10.—The Laughing Buddhist. A very pious and generous man. He died of excessive laughter.

Case 11.—The Sleeping Buddhist, who made a vow to open his eyes only on the 30th of June. Consequently the people celebrate this day as a holiday.

Case 12.—The Myth of the Princess, who to select a husband threw her handkerchief in the Temple Court. It fell at the feet of a beggar, whom she married in spite of the wishes of her family, and he became Emperor of China.

No. 13.—Represents the Myth of the Six Kings, who after long wars were reconciled by Soo Chun; the latter, as a reward, was made Prime Minister by each of them.

Nos. 14 and 15.—Giants placed on each side of the temple door as door-keepers. They are supposed to keep away evil spirits.



PLAN OF EAST COURT.

EAST COURT.**ETHNOLOGY AND ARCHEOLOGY OF AMERICA.**

Near the west end of the Court stands a colossal group in plaster representing a combat between an Indian hunter and a buffalo. On the west side of this is a group of three Indians in plaster, engaged in quarrying flint and roughing out the forms of implements and utensils; on the south side is a model of the great serpent mound, Adams County, Ohio; on the north, the model of an ancient fortified hill, Ross County, Ohio, and on the east two examples of the earthen altars, found in Ohio mounds, on which pearls and other valued articles were sacrificed.

Next east of these exhibits is a group of large primitive boats, and other smaller specimens are suspended above.

ALCOVES OF THE EAST COURT.

Alcove 81.—Deposit of nearly 8,000 flint disks found in a small mound of the Hopewell Group, Ross County, Ohio.

Alcove 82.—Model of Turner Group of Mounds, Ohio. Model of Clarke's Works, Ohio.

Alcove 83.—Antiquities from St. Nicholas Island, Southern California, including mortars, mealing stones, perforated stones, axes, bone implements, pottery and shell ornaments.

Alcove 84.—Mummies, pottery, basketry, sandals, ropes and woven articles of the Cliff Dwellers of Utah.

Alcoves 85, 86 and 87.—Collections from the Pueblo country, ancient and modern, and models of towns and dwellings.

Alcove 88.—A buffalo-skin lodge of the Cree Indians.

Alcove 89.—This entrance to the South American exhibits is occupied by antiquities from the ancient graves of Peru and Chili. These are subject to removal as other collections are acquired.

Alcove 90.—Contains collections of antiquities from the southern states.

Alcove 91.—The cases of this alcove are devoted to archæologic collections from Wisconsin, and to a series of exhibits illustrating the quarrying, mining and implement-making industries of the early inhabitants of Ohio, Indian Territory, Arkansas, Michigan, Minnesota and the District of Columbia.

Alcove 92.—On the wall are reproductions of ancient Mexican shields. In the wall case are numerous articles of clay and stone from various parts of North America. The floor cases contain collections from the mounds of Ohio, from the shell heaps of Maine and village sites in New Jersey.

Alcove 93.—An interesting group of articles and objects from the Indians of the Northwest Coast. The case standing on the west side of the entrance contains several richly ornamented ceremonial blankets made of mountain goat wool and cedar bark obtained from the Indians of Chilkat, Alaska; besides these are painted skin robes and various bark fabrics. The case on the east side contains a number of Chilcat blankets and a variety of garments, mats, etc., made of cedar bark and nets and fishing implements of the Kwakiutl Indians.

Against the walls are numerous examples of the remarkable carved posts of the Northwest Coast tribes. Occupying the center of the west side are two carved and painted house posts of the Kwakiutl Indians, the figures representing personages connected with the myth of the clan. The lower figures represent fabulous beings; the small heads on the south post represent slaves which were given in payment for the carvings. Across the top of these posts rests the beam which supports one end of the main roof beam of the house; the other end rests on a post placed at the back of the house and seen against the western portion of the south wall. On the sides of the west wall are two smaller posts from the interior of a Belacoola house. In the middle of the east wall is a large heraldic column from Belacoola, representing a grizzly bear; on each side, house-posts from Nanaimo, British Columbia. The northern one represents a man holding a goose; the southern one represents a fabulous xoalxol. At the back on the east side is a heraldic column forming the entrance to a Belacoola house.

Alcove 94.—The prow of a canoe of the Haida Indians ornamented with totemic figures is set against the wall. Models of houses of Indians of Cape Flattery and Vancouver Island occupy the floor space.

SOUTH COURT.

AMERICAN ABORIGINAL SCULPTURE.

The South Court contains mainly reproductions of Central American antiquities. At the north end of the South Court are exhibited four Totem Poles, or Heraldic Columns, from British Columbia and Alaska. The two western ones were presented by Mr. Ed. E. Ayer. The carvings on these columns represent the crests of the owners.

Nos. 1 to 6.—Stelæ from the Ruins of Copan, Honduras.

No. 7.—Altar, Village of Copan, Honduras.

Nos. 8 to 12.—Altars from the Ruins of Copan, Honduras.

No. 13.—Idol from Quirigua, Guatemala.

No. 14.—Statue of Tlaloc; Mexico.

No. 15.—Idol from Quirigua, Guatemala.

No. 16.—Stela from Uxmal, Yucatan.

Nos. 17 and 18.—Altars from the Ruins of Copan, Honduras.

No. 19.—Large carving from Labna, Yucatan.

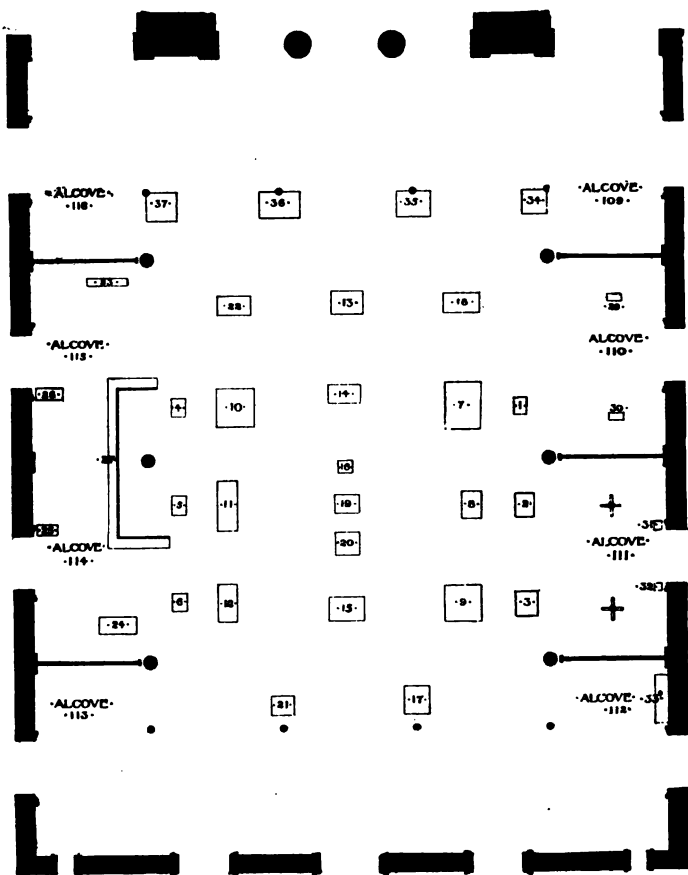
No. 20.—Altar in shape of a monkey.

Nos. 21 and 22.—Altars, Ruins of Copan, Honduras.

Nos. 24 to 26.—Stone sculptures from S. Lucia, Cozumalualpa, Guatemala.

No. 27.—Frieze of a grave monument in Yucatan. Over the frieze are casts of a number of carved doorsteps. A series of photographs of Central American ruins are exhibited on the inside.

No. 28.—Stone sculpture, Ruins of Copan, Honduras.



PLAN OF SOUTH COURT.



Nos. 29 and 30.—Stone sculptures from S. Lucia, Cozumahualpa, Guatemala.

Nos. 31 and 32.—Stone sculptures from Mexico.

The eastern alcoves contain the Charnay collection of reliefs from Mexico and Yucatan.

ALCOVE 112.—Gate-way from Chichenitza. Carvings in wood and stone from the same place.

ALCOVE 111.—Reliefs from Chichenitza and from Palenque.

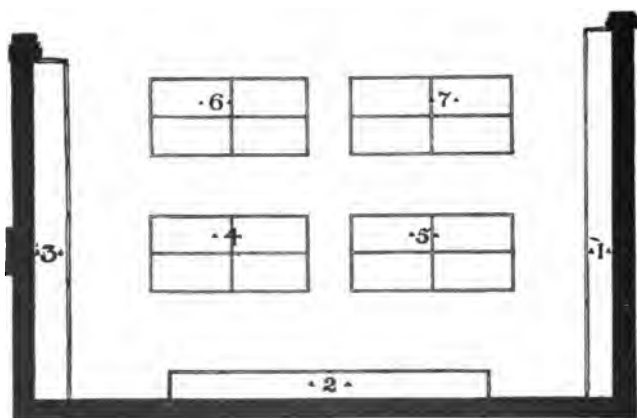
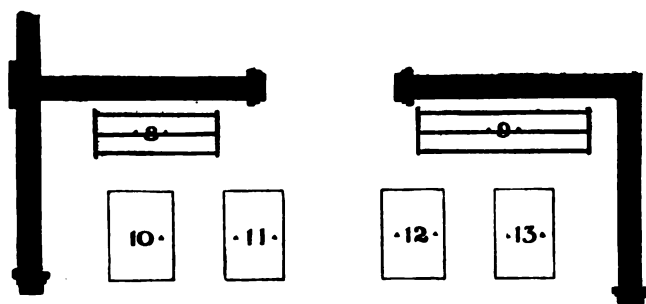
In the alcove photographs of Central American Ruins.

ALCOVES 110 and 109.—Reliefs from Chichenitza and Palenque.

ALCOVE 113 and South Wall of 114.—Reliefs from Santa Lucia de Cozumahualpa—originals in Berlin.

West Wall of ALCOVE 114.—Reliefs from Honduras.

North Wall of ALCOVE 115 and ALCOVE 116.—Reliefs from Sastanquiqui, Guatemala.



PLAN OF HALL 10.



HALL 10.

ESKIMO.

Case 1.—Eskimo, Port Clarence, Alaska, in his kayak.

Cases 2 and 3.—Clothing, weapons and various utensils, implements and other articles of the Eskimo of Port Clarence, Alaska.

Case 4.—Miscellaneous implements, utensils and other articles, Eskimo, Alaska.

Case 5.—Wooden boxes, buckets and cups; powder horns and stone lamps, Eskimo, Alaska.

Case 6.—Textile articles, including baskets, mats, nets, and implements for netting and weaving, Eskimo, Alaska.

Case 7.—Dolls, doll's clothing and pouches made of skins of birds and quadrupeds, Eskimo, Port Clarence, Alaska.

Case 8.—Sleds from North Greenland and Alaska.

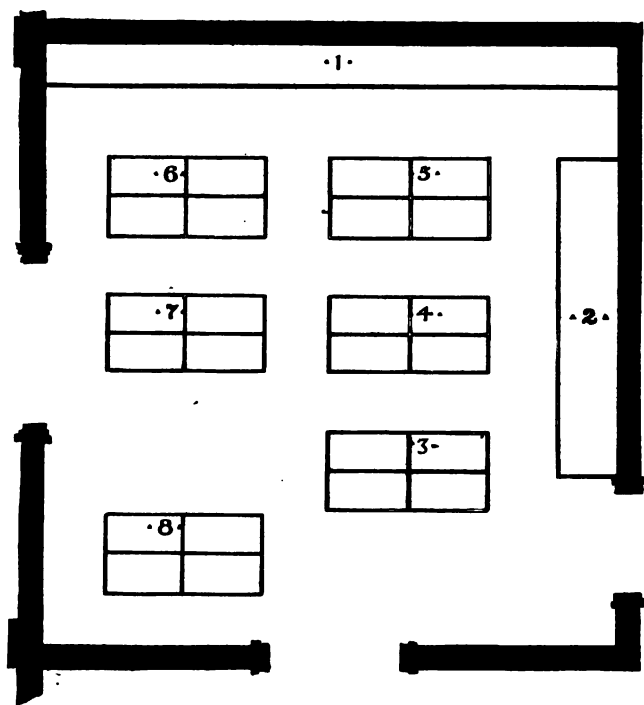
Case 9.—Sleds from Alaska.

Case 10.—Model of a snow house of the Eskimo of Baffin's Land.

Case 11.—Model of a stone house of the Eskimo of Baffin's Land.

Case 12.—Model of a summer tent of the Eskimo of Baffin's Land.

Case 13.—Model of a house of the Eskimo of East Greenland.



PLAN OF HALL 11.



HALL 11**ESKIMO.**

Case 1.—Contains a number of excellent costumes made of skins of deer, seals, birds and squirrels. Alternating with these are harpoons, spears, ice canes, ice scoops, boxes, baskets, etc., Eskimo, Alaska.

Case 2 is occupied by collections from the Eskimo of northern Greenland.

Case 3.—Adzes, knives, scrapers and other implements, Eskimo of Alaska.

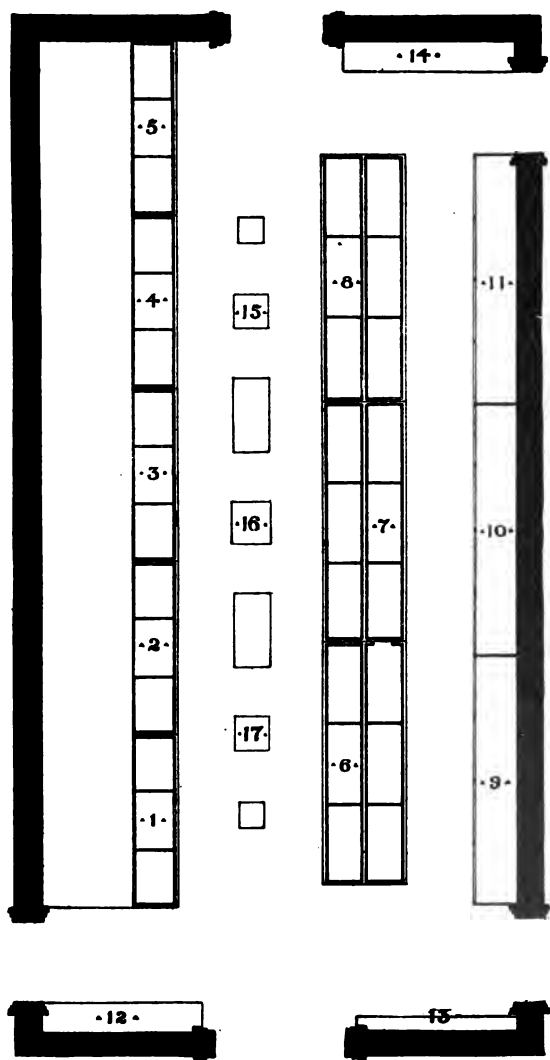
Case 4.—Drilling and fire making apparatus occupy the east end, and bird snares and various traps for catching animals the west end, Eskimo of Alaska.

Case 5.—Fishing tackle and implements used in fishing, Eskimo of Alaska.

Case 6.—Bows, arrows and quivers, Eskimo of Alaska.

Case 7.—Harpoons, darts, spears, arrows and throwing boards, Eskimo of Alaska.

Case 8.—Models of sleds, kayaks, snow shoes, fish traps, etc., made by the Eskimo of Alaska.



PLAN OF HALL 12.



HALL 12.**NORTH PACIFIC COAST.**

On the West Side of the hall is a model of a portion of the village of Skidegate, arranged on a platform. This model presents the characteristic features of the villages of the Haida Indians who inhabit Queen Charlotte Islands, British Columbia. The carved columns in front of the houses represent the crests of the house owners. The large isolated columns in front of the house are erected in memory of deceased relatives or friends. The posts having a large carved board attached to their tops are graves, the bodies being deposited behind the carved board on the top of the column.

Cases 1, 2, 3, 4 and 5 contain various articles obtained from the Haida, Tsimshian and other tribes of Northern British Columbia and Southern Alaska. Attention may be called to the numerous ceremonial objects made of cedar bark and worn or used in the dances of secret societies; to the carved wooden rattles and particularly the large wooden whistles and trumpets which are supposed to imitate the voices of spirits.

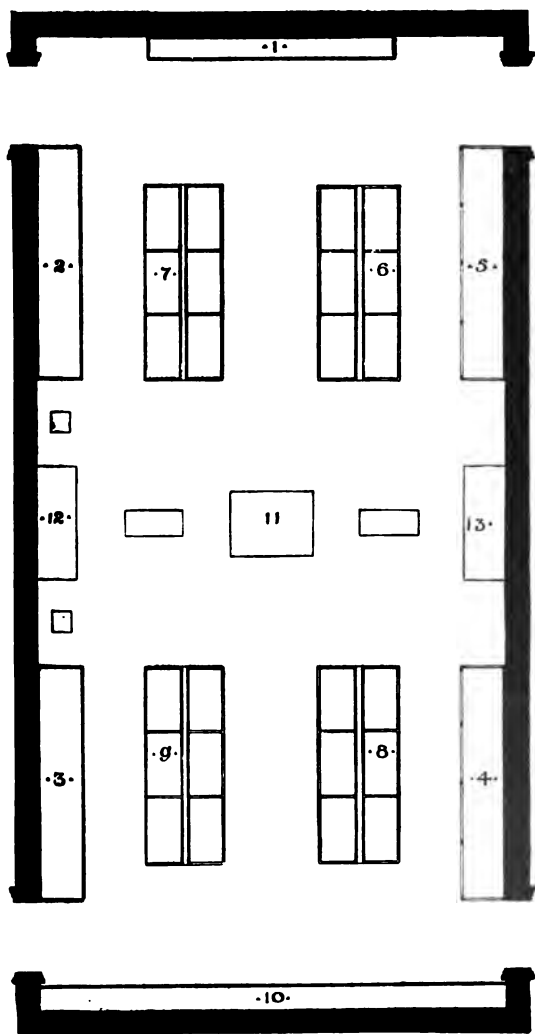
Case 6.—Miscellaneous articles from the Northwest Coast Tribes.

Cases 7 and 8 are filled with various utensils, ornaments and ceremonial objects obtained from the Belacoola Indians of British Columbia.

Case 9.—The southern portion of the case contains a collection from the Haida Indians of Queen Charlotte Islands. The northern portion of the case contains specimens collected among the Tsimshian Indians of British Columbia.

Cases 10 and 11.—These cases are filled with an interesting series of masks and other articles obtained from the Belacoola Indians of British Columbia. The center of case 10 is taken up by portions of a large mask representing a winged dog, the fabulous ancestor of one of the tribes in the interior of the country.

No. 14.—On the pedestal at the north end of the hall are models of a Haida house, and a chief's grave; the latter is in the form of a house, the custom being to place the coffin on the inside. At the south end on a pedestal are models of three houses of the Belacoola Indians, and on the opposite side of the doorway is a series of models of heraldic columns from various parts of the Pacific Coast.



PLAN OF HALL 13.



HALL 13.**NORTH PACIFIC COAST.**

Cases 1 and 2.—Collection of masks, rattles, ornaments, etc., used in ceremonial dances of the Indian Tribes of British Columbia.

Cases 3, 4 and 10.—Masks and dancing ornaments mainly of the Kwakiutl Indians of Vancouver Island; boxes, dishes, ropes, etc., of the same people.

Case 5.—Utensils, masks and basketry from the west coast of Vancouver Island, from Puget Sound and from Shoalwater Bay. Wood carving representing the guardian spirit of a medicine-man of the Chinook Indians. Models of types of canoes used by the Indians of the State of Washington. Cradle of the Chinook Indians.

Case 6.—Ornaments, dishes, spoons and snow shoes of the Indians of Puget Sound. Stone implements from the interior of British Columbia.

Case 7.—Rattles, ornaments and utensils from the Indians of the Northwest Coast.

Case 9.—Kwakiutl Indians: Battle axes, pile drivers, rattles, dancing implements; various forms of money such as pieces of copper tied together by fours and brass bracelets fastened to sticks.

Case 8.—Kwakiutl Indians: Food products, household utensils, models of house posts, and gambling implements.

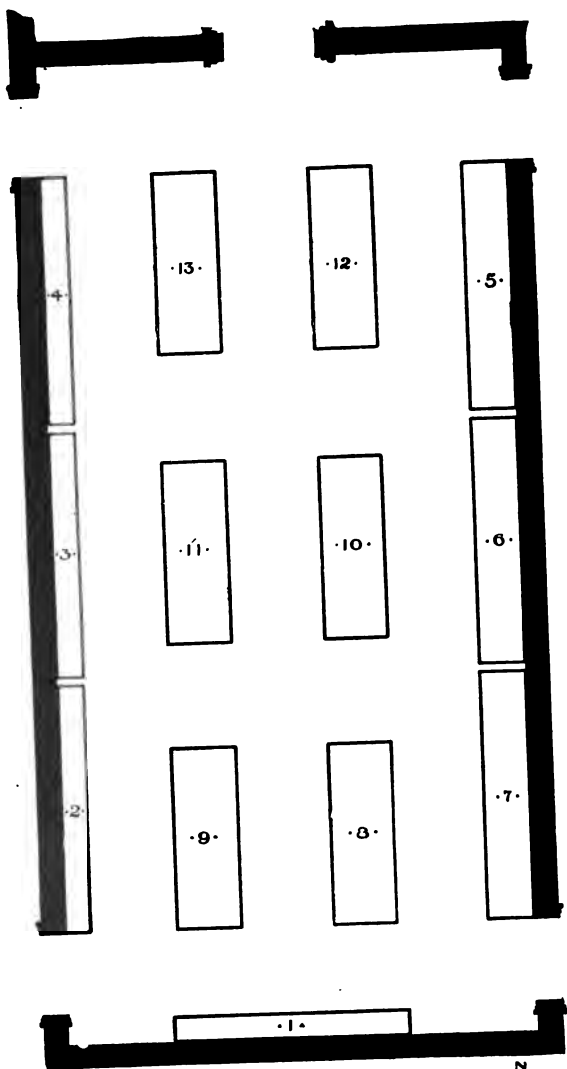
Case 11.—Cannibal dancer; Kwakiutl Indians of Vancouver Island.

Nos. 12 and 13.—Bed rooms of the Kwakiutl Indians of Vancouver Island, with painted designs representing the crests of the occupants.

On the North Wall.—Large carving representing a fabulous double-headed snake; used in ceremonies.

On the South Wall.—The carving over the case represents the same fabulous being, and is used in the same manner.

On the East and West Walls.—The painted boards represent crests of a clan of Kwakiutl Indians. One of these doorways is placed in front of the house, the other in the rear of the house.



PLAN OF HALL 14.



HALL 14.

PERU.

This hall contains collections made by Mr. G. A. Dorsey, and Lieutenant Safford. It is entirely devoted to Peruvian antiquities, most of the material being the result of excavations made in ancient graveyards of various parts of Peru and illustrating the culture of the Pre-Columbian Peruvians.

Case 1.—Contains select pieces found in graves of Ancon and in other parts of Peru. The pieces contained in this case are especially well preserved. The case contains principally ponchos, bags, feather work, copper ornaments, and a few stone implements.

Case 2.—Pottery found in Chancai. In comparing the contents of this and the following cases it will be noticed that each locality has its peculiar characteristic type of pottery.

Case 3.—Pottery found in Sierra Gorda. This pottery resembles very much the pieces found in Ancon. The two top shelves of the case contain specimens from Chimbote.

Case 4.—Pottery from Chimbote. Stone carvings and pottery from Ecuador take up the bottom shelf.

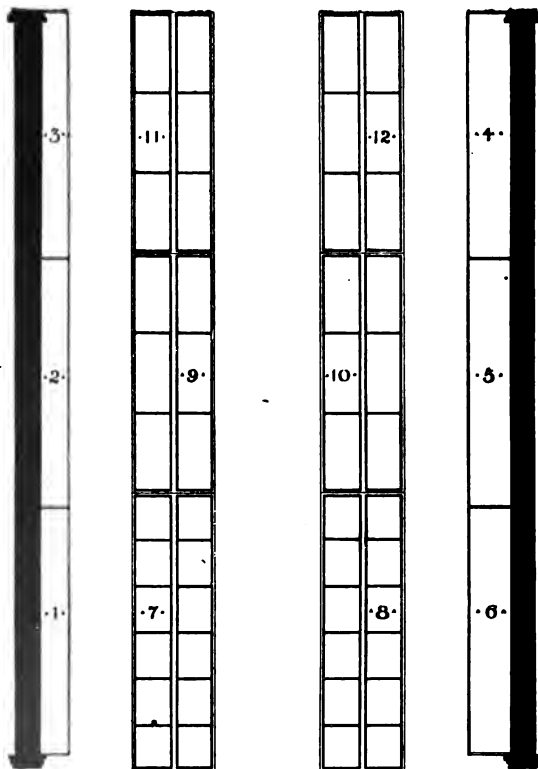
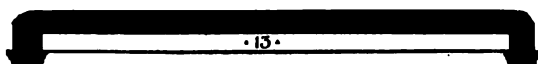
Case 5.—Mummies found in graves at Ancon. On the shelves of the case some smaller mummies are exhibited which were found in the same graves in which the larger mummies were found.

Cases 6 and 7.—Mummies found in graves at Ancon. On the shelves there are pottery and clothing found on the surface of the graveyard.

Case 8.—Contents of a grave from Chancai. The mummy and the surrounding pottery are kept as nearly as possible in the position in which they were found.

Case 9.—Mummies from Cuzco.

Cases 10 to 13.—Graves from Ancon. These graves were at a depth from six to ten feet. The contents of the graves have been kept in the same arrangement in which they were found.



PLAN OF HALL 15.



HALL 15.

PERU AND COLOMBIA.

This hall contains part of the collection of Mr. G. A. Dorsey, the collective exhibit of the United States of Colombia at the World's Columbian Exposition, and the Montes collection.

Cases 1 to 3.—Pottery and stone implements from the United States of Colombia.

Case 4.—Pottery from Cuzco, Peru. A number of remarkably large vases are exhibited on the bottom of the shelf. The central part of the bottom of the case is occupied by small reproductions in stone of architectural works.

Case 5.—Pottery and inlaid wood work from Cuzco, Peru.

Case 6.—Pottery from Cuzco, Peru.

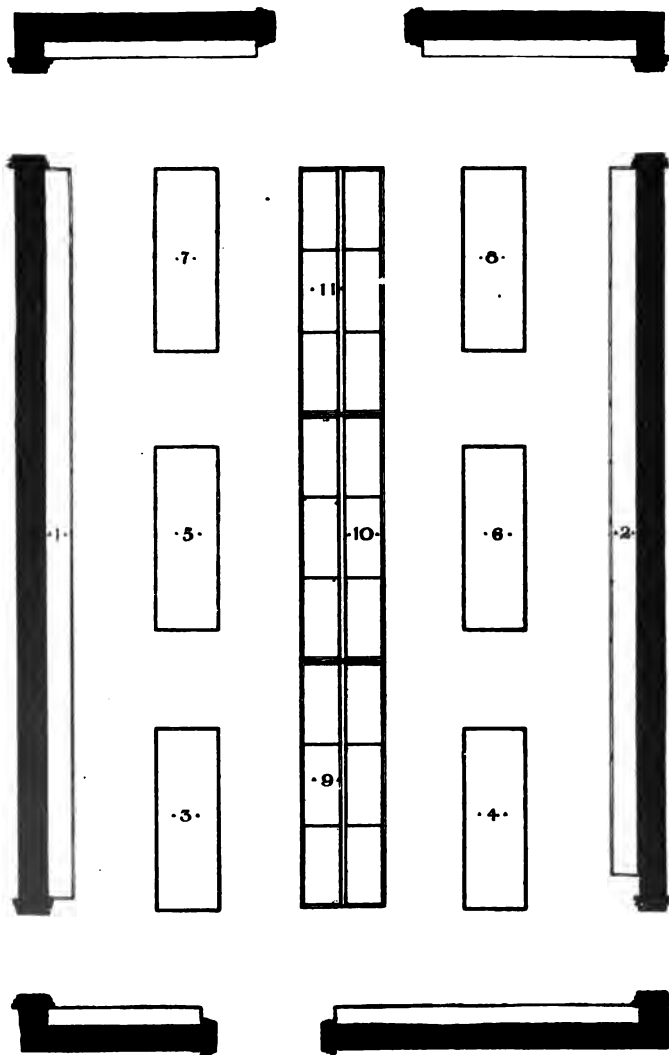
Cases 7, 8, and 9.—Contents of graves from Ancon, Peru.

Case 10.—Stone carvings and pottery from Cuzco, Peru.

Case 11.—Contents of graves from Iquique, Chili.

Case 12.—Various ornaments and other articles in gold, silver and copper from the ancient burial places of Peru.

Case 13.—Remarkable series of ornaments in gold and copper—gold alloy from the ancient graves of Colombia, S. A.



PLAN OF HALL 16.



HALL 16.

SOUTH AMERICA.

This hall contains mainly collections from the Atlantic watershed of South America, and from the West Indies. The principal collections are those of Messrs. J. J. Quelch, Mr. Roger Welles, F. A. Ober, and Lieutenant Safford.

Case 1.—Beginning at the southern end of this case: Bottom shelves. Pottery from Curacao. First shelf: Stone implements from the West Indies. The upper part of the case contains modern pottery and utensils from Porto Rico. Farther northward, a collection from the Salamanca Indians, Costa Rica: lances, arrows, nets, paddles, bags, and hammocks. North of this there is a collection illustrating the clothing, the weaving industry, and some miscellaneous objects from the United States of Colombia. The northernmost portion of the case contains specimens from British Guiana: A mortar; head ornaments; a wrestling shield; cassava grater.

Case 2.—Models of Bolivian and Peruvian Indians in native and mixed costumes, and interesting exhibits of textile and other products obtained from the natives of these countries.

Cases 3 and 4.—Brazilian basketry.

Case 5.—Venezuela: Hammocks, lances, bows and arrows, blow guns, and poisoned arrows; cassava grater; torch; bark cloth.

Case 6.—Venezuela: Hammock; arrows; basketry; pottery.

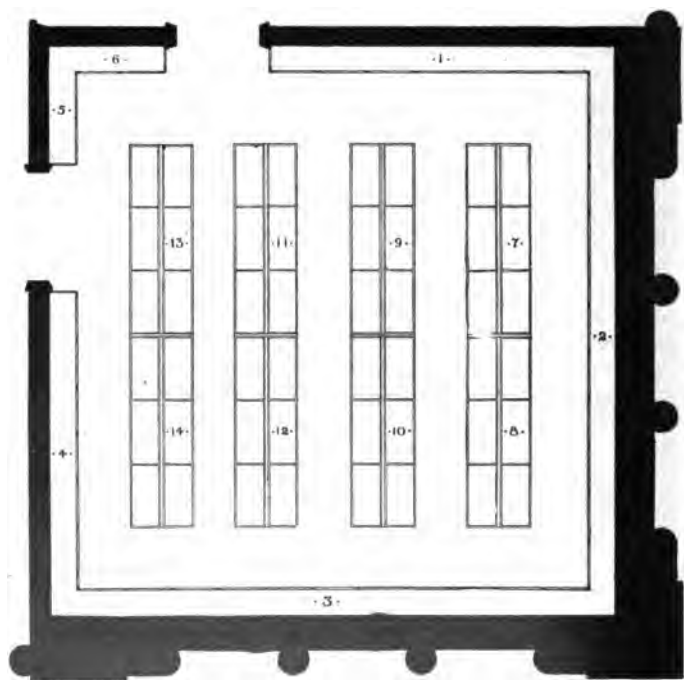
Case 7.—British Guiana: Hammocks; strainers; winnowing baskets; material for basketry; baskets.

Case 8.—British Guiana: Pottery; gourds; head ornaments.

Case 9.—Ornamented gourds, ropes, dolls, bark clothing, bows and arrows, and feather ornaments from Brazil.

Case 10.—The southern part of Case 10 contains bows from Venezuela; ornaments; poisoned arrows; small graters; paints; flute; twine.

Case 11.—Ornaments and implements of the Indians of the upper Amazon.



PLAN OF HALL 17.



HALL 17.**PARAGUAY.**

This hall contains the collections of Dr. E. Hassler. The tribes represented in the collection inhabit the Gran Chaco. The most northern tribes inhabit Brazilian territory, while the more southern ones live in Argentine Republic. The principal tribes represented are the Tobas, Lenguas, Chamacoccos, Guaranis, Cuximosso, Panas, Paitas, and Omiris. The collection is remarkable because it represents tribes which have had hardly any contact with civilization. The collection contains a vast amount of beautiful feather work, and a number of most interesting stone weapons. Case 13 contains a collection made by Lieutenant D. U. Bertollette.

Case 1.—Feather ornaments; particularly head ornaments and necklaces, pottery, feather wands.

Case 2.—Feather belts, wands, feather ornaments, rattles, necklaces, ropes, bags.

Case 3.—Feather wands, bags, hammocks, nets, ropes, bows.

Case 4.—Bows; in the upper part of the case, bows with double bow-strings for shooting balls; spades for digging roots; paddles; wooden lances; arrows for war and hunting; stone axes ornamented with feathers; wooden clubs; fish-trap, which is let down over the fish, the latter being taken out from underneath by the fisherman.

Case 5.—Hammocks; arrows.

Case 6.—Bows and arrows; feather wands; head ornaments; ornamented gourds; pottery.

Case 7.—Feather ornaments.

Case 8.—Necklaces of bones; rattles; fans; hats; stone axes; ornaments made of shells and of fruits; rattles made of turtle shells.

Case 9.—Feather ornaments.

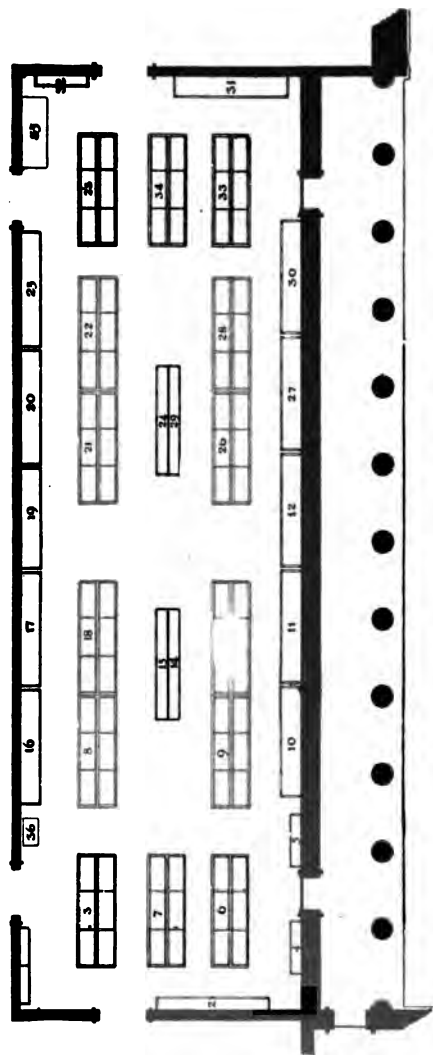
Case 10.—Ornaments of shells; fire drill; gourds; amulets; spindles; flutes; pipes; combs; necklaces.

Case 11.—Feather ornaments.

Case 12.—Necklaces; rattles.

Case 13.—Bows and arrows; bags; lances; feather ornaments.

Case 14.—Feather ornaments.



PLAN OF HALL 18.

HALL 18.--AYER HALL.

PRIMITIVE TRIBES OF NORTH AMERICA.

Cases 1, 2 and 3.—Clothing, implements, utensils, etc., of the Alaskan Eskimo.

Cases 4, 5 and 6.—Clothing, implements, utensils, etc., from the Eskimo of northern Greenland and the shores of Hudson Bay.

Case 7.—Rattles, carved clubs and batons, pipes, carvings in wood and ivory, from the Indian tribes of Alaska and British Columbia.

Case 8.—Carved wooden dishes and spoons made of horn of mountain sheep and goats, from Indians of Alaska and Northern British Columbia.

Case 9.—Basketry of the Northwest Coast.

Case 10.—Carved dishes and spoons from Alaska and British Columbia; wooden helmets, dancing hats, dishes made of whale vertebra, from Alaska; baskets from the Indian Tribes of the Northwest Coast.

Case 11.—Basketry of the California Indians.

Case 26.—Clothing implements, utensils, etc., of the California Indians.

Case 12.—Basketry of the Pimo, Yuma and Moki Indians.

Case 27.—Basketry of the Apache Indians.

Case 13.—Clothing, implements, utensils, etc., Apache Indians.

Case 14.—Clothing, implements, utensils, etc., Apache Indians.

Case 16.—Clothing, implements, utensils, etc., Athapascan and Cree Indians.

Case 17.—Clothing, implements, utensils, etc., Cree Indians.

Cases 18, 19, 20, 21, 22 and 24.—Clothing, utensils, implements, etc., Sioux Indians.

Case 23.—Clothing, utensils, implements, etc., Cheyenne, Arapaho and Crow Indians.

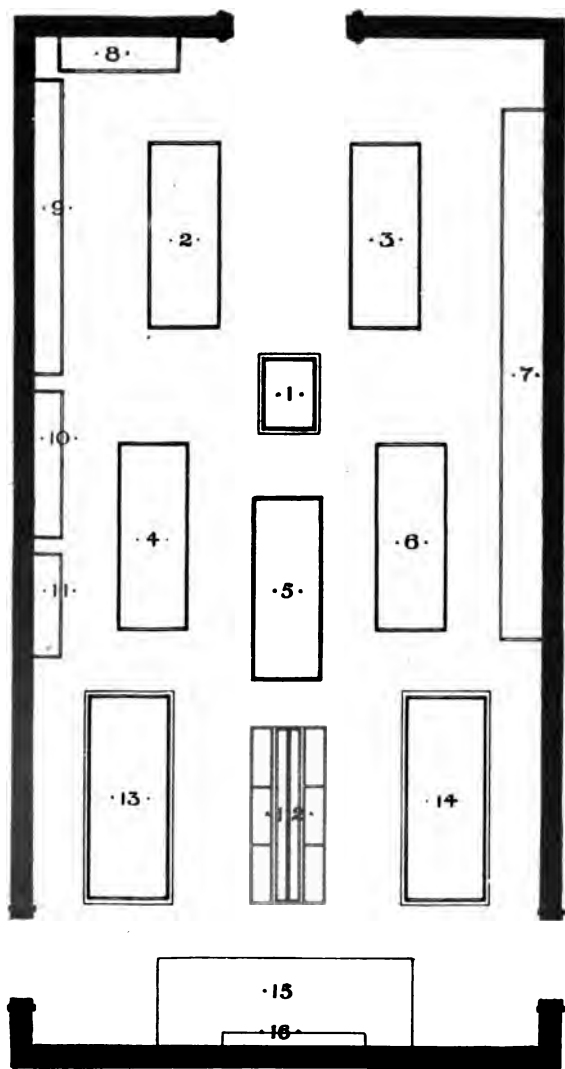
Case 25.—Clothing, utensils, implements, etc., Ute Indians.

Case 34.—Various articles from the Cherokee and Catawba Indians.

Cases 30, 31 and 32.—Pottery and other articles from the Pueblo Indians.

Case 29.—Blankets and weaving apparatus of the Navajo Indians.

Over the wall cases are suspended canoes and boats from various tribes.



PLAN OF HALL 22.



DEPARTMENT OF INDUSTRIAL ARTS.

Such contributions to the Department of Industrial Arts as are available for Museum purposes have been arranged to show, as far as possible, the more important steps which have led to improvement in handiwork, or progress in the invention of those implements, machines, and processes which have proved to be important factors in the world's material development.

The objects exhibited have, with a few exceptions, been culled and classified from a large mass of contributed material. Owing to the limited space available for the creation of special sections, many gifts to the department have been temporarily placed in storage.

Since intercommunication has had so great an influence upon every department of applied science, and especially upon what may be called the epoch-making inventions, the groupings have been made irrespective of geographical lines.

The Sections of the Department of Industrial Arts thus far created are as follows, located in the Halls specified:

IN HALLS ADJOINING THE WEST COURT.

Section of Animal Industries: Hall 22, Alcove 96.

Section of Fishery Industries: Hall 23, Alcove 97.

Section of Ceramic Industries: Hall 30, Alcove 107.

Section of Textile Industries: Hall 31.

Section of Gems, Gold, and Curios: Hall 32, Alcove 105.

Section of Miscellaneous Industries: Hall 33.

IN WEST PAVILION.

Section of Metal-Working Industries: Hall 76.

IN EAST PAVILION.

Section of Transportation.

- A. Marine Transportation: Hall 37.
- B. Human Burthen-Bearers: Hal. 38.
- C. Pack Animals: Hall 39.
- D. Land Vehicles: Halls 40 and 55.
- E. Steamboat: Hall 54.
- F. Street (or Tram) Cars: Hall 54.

The large objects in the North, East, and West Courts have been installed by and are assigned to the care of the Director of this Department.

HALL 22 AND ALCOVE 96.

SECTION OF ANIMAL INDUSTRIES.

In this Section will be found a valuable collection of tanned skins and leathers, exhibited at the Columbian Exposition in the United States Government Building by Tiffany & Co., which the Museum has recently acquired. This firm began to make this collection in 1876, in order to acquaint themselves with the industrial possibilities of using the skins of fishes, reptiles, birds, and rare mammals. It was the forming of this collection that has led to the introduction of the leathers made from the frog, alligator, snake, and other reptiles. Among the four hundred examples will be found leathers of the elephant, lion, camel, giraffe, monkey, cat, dog, crocodile, lizard, frog, shark, wolf-fish, etc., collected from Australia to Alaska.

Here also will be found an extensive collection of footwear and other objects, given to the Museum by the governments of Russia and Turkey, including an interesting collection of leather articles from Jerusalem, and skins from Argentine Republic.

Interesting models illustrating the advanced methods adopted for the slaughtering and shipping of cattle, etc., in a typical Chi-

cago abattoir, are also shown, together with models illustrating the means taken to prevent the infection of meats at Kansas City, and at cattle hospitals located elsewhere.

Case 1.—Mounted Wolf-fish, and articles made in Russia from Wolf-fish skins.

Case 2.—Fish and Reptile Leathers, collected by Tiffany & Co.

Case 3.—Reptile, Bird, and Mammal Leathers, collected by Tiffany & Co.

Case 4.—Mammal Leathers, collected by Tiffany & Co.

Case 5.—Waterbags, Harness, Pocket-books, Emblems, Pouches, and other manufactured articles, from Turkey and Jerusalem; Harness from Burmah; Shoe and boot uppers from Russia.

Case 6.—Skins of mammals (tanned), collected by Tiffany & Co.

Case 7.—Skins of Mammals, from Turkey, Russia, and Argentine.

Case 8.—Small models of Cattle and Sheep, from Germany.

Case 9.—Footwear, from Turkey and Jerusalem.

Case 10.—Ornamented Turkish shoes; Sandals worn by Buddhist Priests; Sandals, from Burmah.

Case 11.—Russian Shoes and Boots made from felt and leather.

Case 12.—Skins of Mammals from Argentine, Turkey and Russia.

No. 13.—Model of a Cattle Abattoir at Chicago, showing machinery and methods of killing.

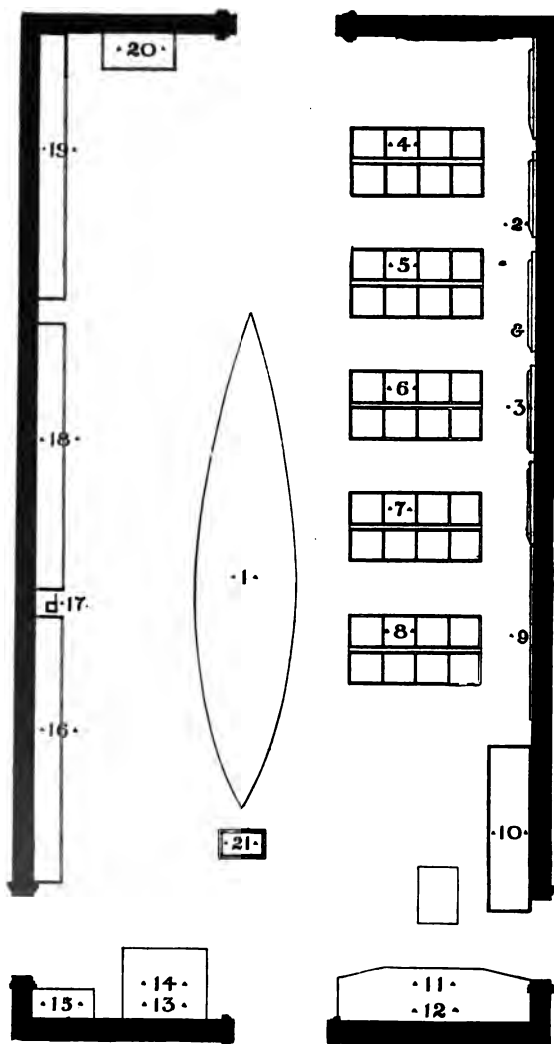
No. 14.—Model of Hog Abattoir at Chicago, showing method of killing and packing.

No. 15.—Model of a Cattle Hospital at Garfield, N. J.

No. 16.—Model of the Stock Yards and Cattle Quarantine Station at Kansas City, Mo., on south wall.

ALCOVE 96.

Cases 1 and 2.—Skins of Mammals (tanned), collected by Tiffany & Co.



PLAN OF HALL 23.



HALL 23 AND ALCOVE 97.

SECTION OF FISHERY INDUSTRIES.

The Museum has been fortunate enough to acquire the very valuable collection which comprised the cabinet of curiosities of the Whale Ship "Progress," which, after many years' service in the Northern Seas, found a safe harbor in South Pond during the Exposition, where it attracted much attention.

The decadence of the whale fisheries during late years renders this collection a most important addition to the Museum. It is not improbable that the time may come during the life of the present generation when the sperm and the right whale on the high seas will be almost as much of a curiosity as the buffalo upon the prairie; the introduction of a modern harpoon fired from a gun, having taken the place of the hand lance, is devastating the sea in a manner somewhat similar to the slaughter of the denizens of the prairie by the repeating rifle in the hands of the modern hunter.

Among the many interesting objects, the quadrant brought over in the "Mayflower" in 1620 will attract particular attention. The series showing the various stages in the development of the harpoon is also of special interest; also the large collection of whales' teeth and bones.

No. 1.—Original whale boat from Bark "Progress," fitted out ready for service, and containing life-size figures of six sailors. A whaler in the bow stands ready to drive the harpoon into a whale according to the olden practice.

Nos. 2 and 3.—Models of whaling ships; also pictures from cabin of the Whaler "Progress." On wall.

Case 4.—Sperm whale teeth, walrus tusks, and narwhal horns, from which sources ivory is obtained for making many small objects, some of which may be found in Case No. 5.

Case 5.—A collection of curios, such as yarn swifts, a set made from cowry wood; paper knives and canes made by sailors on board ship.

Case 6.—Sperm whale teeth and large narwhal horn. Many of these have been taken from old whales, and show how the grinding surface becomes worn after use for several hundred years.

Case 7.—Sperm whale teeth dressed and ornamented by sailors on board ship.

Case 8.—Log-books, charts, barometer, chronometer; compasses, and quadrants taken from old whalers, and a shipping list published in New Bedford in 1847, giving an account of all American whalers in service at that time.

No. 9.—Shield on wall, containing slabs of whale-bone.

Case 10.—Curios from New Bedford whale ships; whale teeth; walrus heads and tusks; narwhal horns; saw-fish saws; sword-fish horns; porpoise, black-fish and shark jaws; skeleton of sea-snake; samples of different grades of whale and seal oil; whale and ship barnacles; wood from ship's bottom; ship's pitchers; and cast model of sperm whale.

No. 11.—Ribs and vertebrae of whale.

No. 12.—Lower jaws and ribs of sperm whale.

No. 13.—Shield on wall, containing blubber spades, harpoons, and lances, flencing and blubber knives and knife steels.

No. 14.—Copper cooling kettle, funnel, oil barrel, dippers and strainers used in trying out and barreling oil; blocks, hook, and tackle used in taking in "the blanket piece" on deck.

No. 15.—Cooper's tool-chest taken from the whale-ship "Progress."

Case 16.—A collection of implements used in whaling: guns, harpoons, and bomb-lances of the various kinds, illustrating the progress of the whaling industry.

No. 17.—Samples of the Cunningham line-carrying rockets.

Case 18.—Arctic clothing worn by members of the Greely Relief Expedition, including reindeer and felt sleeping bags; polar bear skins and felt suits; harness used by men when drawing sledges.

Case 19.—Articles collected from the South-Sea Islands, by sailors on whaling ships, including samples of tapa, or bark-cloth; suits made from grass; war suits and weapons; models of canoes and paddles; idol; heads carved from cocoa-nuts; and poi in dish.

Case 20.—Articles collected by sailors on whaling ships: samples of grass-cloth and rugs; articles made from grass-cloth from Madagascar; lady's work-box and two small chests made on board ship by sailors.

Case 21.—A collection of samples of oil of various qualities used for lubricating clocks, chronometers and watches.

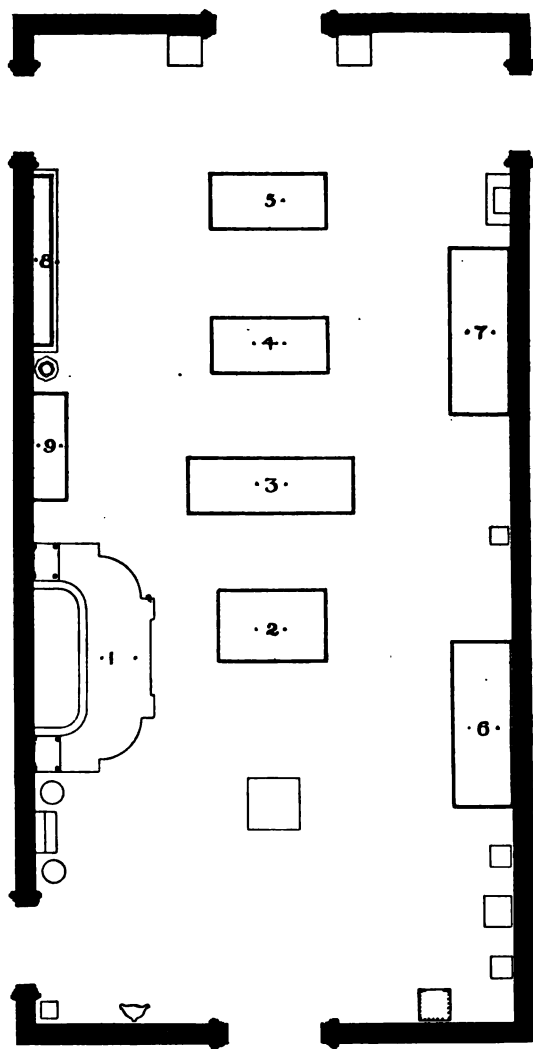
ALCOVE 97.

In this alcove may be found nets, seines and floats from Norway and a primitive stone anchor also from Norway. The cases contain fine collections of lines, hooks, floats, flies, revolving spoon baits and other implements of special interest to the disciples of Isaak Walton, which were presented to the Museum by James Buchanan, Glasgow, Scotland; Bartleet & Son, Redditch, England, and J. T. Buel Co., Whitehall, N. Y.

Photographs of the Baltimore Fishing School in Ireland hang on the walls. This important institution has rendered the most efficient service in preparing young men and boys for duty in connection with the fisheries of Great Britain and the English Colonies.

A seine of over a quarter of a mile long, made in Russia, is displayed upon the high stand; buoys, nets, fish-traps, etc., from other countries, are also located in this alcove.

Over the door leading from the Alcove to Hall No. 23 is a fine well-mounted specimen of the sturgeon; it is from this fish that the useful product known as fish isinglass is taken.



PLAN OF HALL 30.



HALL 30 AND ALCOVE 107.

SECTION OF CERAMIC INDUSTRIES.

The introduction of the most primitive of ceramic arts in any part of the globe is regarded as a first step in the beginning of civilization, and many objects made by the ancient peoples are to be found in the halls devoted to archæology. While the fabrication of Chinese and Japanese porcelain has been carried on for centuries, the manufacture in Europe began only about two hundred years ago. There the great masters of the art for years enjoyed the patronage of kings and princes.

Seventy years ago the first hard porcelains made in America came from the Tucker works near Philadelphia, but the industry languished after 1838. Several pieces of fine "Tucker" ware are in the collection.

The development of the art in America in late years is most encouraging. The handsome pavilion presented to the Museum by the Northwestern Terra Cotta Company of Chicago, which occupies a position in the West Court near the west entrance, is a fine example of the success achieved in artistic Terra Cotta work.

The most striking objects in the Section of Ceramics are the two handsome large royal blue Berlin porcelain Vases, decorated with medallions, Cupids and festoons of golden vines and raised flowers. They stand 9 feet 2 inches high, and are among the largest porcelain vases ever made; they were greatly admired by the thousands of visitors to the German Section in the Manufactures Building during the Exposition. They are a gift from Richard Horstman, of Berlin, and are of great value.

Gerard Dufraissex & Co., of Limoges, France, also made a handsome contribution to this Section, consisting of a large porcelain center-piece for dining table, remarkable for success achieved in delicate coloring at high temperature.

Valuable collections of glassware, earthenware and porcelains were contributed by the governments of Mexico, Sweden and Japan, the Venice and Murano Co., The Worcester Royal Porcelain Co., and the Saint Mary's Porcelain China Works.

Case 1.—Large ornamented Porcelain Vases from Japan; gift of the Japanese Government. "Temptation" and "Victory"

from Japan, made by Fugita Bunzo, Professor of Imperial Fine Art, Academy of Tokio. Porcelain statuettes of Gustave III and Bellman. Large Vases from Sweden. Vases from Jamaica. Satsuma Vase, deposited by F. J. V. Skiff.

Case 2.—Large porcelain center-piece for dining table, one of the largest pieces of hard French porcelain ever made; tints produced at high temperature with oxide colors; gift of E. Gerard Dufraissex & Co., Limoges, France, through Haviland & Abbott.

Case 3.—American views on old English china and porcelain made in Germany and Austria. The north side contains valuable examples of old blue China ornamented with American views.

Case 4.—American Case—containing porcelain and pottery made in the United States exclusively. Tucker porcelains, fine examples of Pennsylvania Dutch Sgraffito ware made early in the century. Tea set of porcelain, covered with gold by "Chryso-Ceramic" process; gift of the Misses Healy, Washington, D. C.

Case 5.—Glassware, manufactured in Ehrenfeld, Prussia.

Case 6.—Glassware, manufactured by the Venice & Murano Manufacturing Co., at their exhibit, Midway Plaisance, Chicago Day, October 9, 1893; gift of the manufacturers. Vases, manufactured by the Worcester Royal Porcelain Co., England. Large Japanese plate, ornamented with gold, by Kakiyemon Lakar. Porcelain plates, large and small, with gold decorations from Japan; gift of the Japanese Government. Vase, exact copy of the Royal Meissen (a German vase), with landscape in Jemtland, by Thorne. Porcelain vase of Greek design, ornamented with gold, a copy of Maricbey similar to the Limoges ware. Porcelain plate with landscape. Gold and blue decorated plate. Porcelain dish ("China style"), and a vase similar to that manufactured by Winston (pate sur pate), from the potteries at Rorstrand, Stockholm.

Case 7.—Mexican pottery; bowls, pitchers, vases from Jerusalem and Sweden.

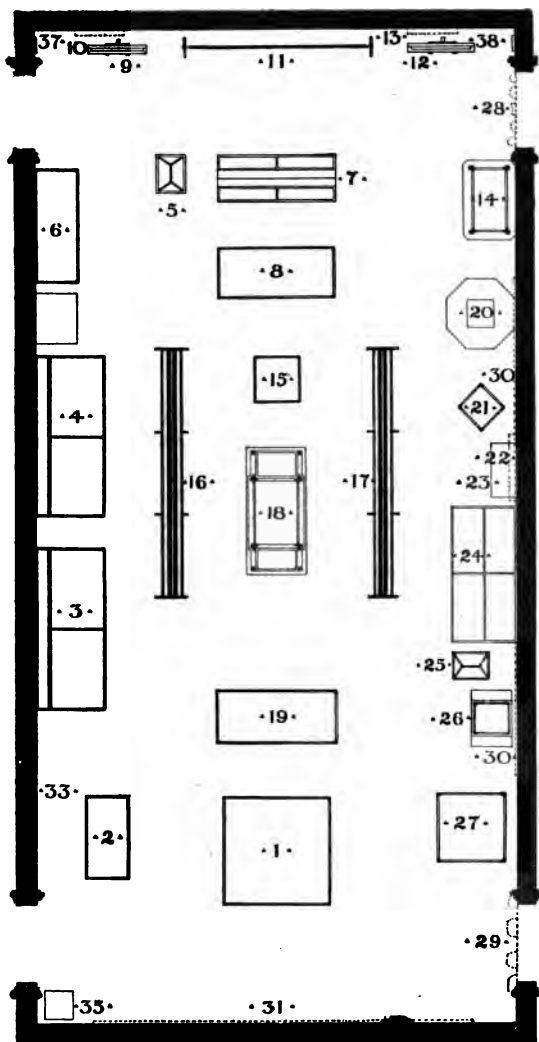
Case 8.—Ornamented and plain bricks, made by Tiffany Pressed Brick Co., Chicago; gift of the manufacturers.

Case 9.—Clay statuettes (busts), made in Mexico by Pantaleon Panduro, San Pedro, Jalisco, Mexico; gift of the Mexican Exposition Commissioner. Pottery from Guatemala.

ALCOVE 107.

Large Royal Blue Porcelain Vasés, manufactured by the Royal Porcelain Works, of Berlin, Germany; gift of Richard Horstman; height, 9 feet 2 inches.

Three ancient earthen wine jars from Rome, which attracted great attention during the Exposition, where they were located near the Horticultural Building. These jars, which have a capacity of about 400 gallons, were in use many years ago in the preparation of wine, and were collected in Italy by an expert sent abroad by the World's Columbian Exposition. No. 1 was found at Lubiaco in the grounds of the late Duc di Sermomta. Nos. 2 and 3 were found at the Villa Ludovici while excavating for the foundation of the new Boncompagni Palace. No. 6 is a large glazed jar of symmetrical form from Japan.



PLAN OF HALL 31.



HALL 31.**SECTION OF TEXTILE INDUSTRIES.**

In this Section it is intended to show the beginnings and development in the art of weaving, thread and rope-making. Many races in different parts of the globe, even in our own century, practiced the most primitive methods of weaving, especially in utilizing coarse fibers in making baskets, hats, and matting.

Well authenticated remains definitely establish the fact that the nations of antiquity from whom the Anglo-Saxon race is descended have manufactured fabrics from time immemorial, as articles of commerce.

No other branch of Manufacture, perhaps, contributes so much to human comfort and happiness as the product of the loom. Progress in textile manufacture has always gone hand in hand with the development of civilization, and each step in the gradual mechanical perfection of the loom has reflected prosperity on the cotton plantation, the flax farm, and the sheep ranch, so that the history of the art is of great interest to the man of affairs as well as to the antiquarian.

The collection of textiles, contains many objects of interest. Beginning with the old hand loom, constructed and used on the Kentucky frontier in the last century, many objects of interest are shown, made by the spinners and weavers of the United States, Java, Jamaica, Turkey, Russia, Bulgaria, Japan, and Korea, including the large linen damask table cloth manufactured in Ireland for Queen Victoria, and exhibited in the British Section of the Manufactures Building during the Columbian Exposition.

The Tsuzure Nishiki Tapestry is one piece 286 square feet in area which occupies the South Wall, is regarded by connoisseurs to be of the highest grade of work made by the artists of Japan.

Upon the Western wall hangs an Antique Persian Frayer-rug—or rather twelve rugs woven in one piece 10x14 feet. This rug was presented to the Museum by Mr. Topakyan, who represented the Persian Government at the Exposition.

Patriotic Americans, anxious for the development of the Manufacture of Art fabrics in the United States, will view with great interest the Chair seat, an exact counterpart of the Celebrated Gobelin tapestry, and fully equal to it in coloring and design, which also hangs on the South wall, beside the above on the left. This is the second piece woven on the Western Continent; it was made at the factory of Mr. Wm. Baumgarten in Williamsbridge, New York. The first piece, woven in 1893, is preserved by Mr. Baumgarten, as an heirloom.

Steps have already been taken to add to this Section at an early date, and collectors are already at work in Europe and elsewhere.

Case 1.—Loom used on Kentucky frontier during the last century.

Case 2.—Jamaica fiber ferns and articles manufactured therefrom.

Case 3.—Turkish silks and textiles.

No. 3 A.—Specimens of flax illustrating successive steps in the manufacture of linen thread.

Case 4.—Turkish silks and textiles.

Case 5.—Cocoons and raw silk from Bulgaria.

Case 6.—Raw Tusser and Muga silk and cocoons.

Case 7.—Enlarged models of silk worms. Moths and cocoons, showing development from the egg.

Case 8.—Model of Japanese hand loom and two embroidered silk pictures. "Plum blossoms" and "Fujisan" (Sacred Mountain).

No. 9.—Japanese silk embroidered picture on easel. "White Phoenix" on "Paulownia Imperialis." To appreciate the wonderful skill of the artist the head of the bird must be examined under the magnifying glass.

The embroidered pictures (Cases 8 and 9) were donated to the Museum by Sheino Shobey, of Yokohama, an expert in this artistic work and are considered rare examples of Japanese embroidery of the very highest grade.

Case 10.—Ramie upholstering goods, Ramie plush goods Ramie dress goods, Ramie corset covering.

Case 11.—Table cloth of linen damask, manufactured for H. R. H. Queen Victoria, by Robertson, Ledlie, Ferguson & Co. This table cloth is $3\frac{1}{2}$ yards by $3\frac{1}{2}$ yards, and is handsomely ornamented with the royal coat of arms.

Case 12.—Napkin; one of a set accompanying the above.

Case 13.—Ramie white goods, laces, etc., table damask.

Case 14.—Cord and twine of manila, Irish and Italian hemp, and threads of Ramie fibre.

Case 15.—Specimens of Russian flax.

Case 16.—Fibers; collection from U. S. Agricultural Department, and articles manufactured from the same.

Case 17.—Fibers; collection from U. S. Agricultural Department, and articles manufactured from the same.

Case 18.—Wool: samples of natural fleece; also fleece scoured and bleached.

Case 19.—Korean silken garments and examples of satin rugs.

Case 20.—Rope; coil 250 feet long, gradually increasing in thickness from one-half to four inches in diameter, made of coconut fiber.

Case 21.—Pine fiber mattings, carpets, and rugs.

Case 22.—Rope and matting made of seath of shuro.

Case 23.—Oakum, felt, and waste jute.

Case 24.—Articles of household use and garments manufactured in Europe for South-American trade, and also manufactured in South-American countries.

Case 25.—Straw hats woven by natives of South and Central American countries and Mexico.

Case 26.—Russian cottons, raw and spun in yarn.

Case 26 A.—Illustrating the successive steps in the manufacture of fine cotton threads. Presented by Geo. A. Clark & Bro.

Case 27.—Laces of natural fiber and needlework from Fayal. Nanduty lace handkerchief from Paraguay. Silk Sampler.

Case 28.—Baskets woven by natives in South and Central American countries, Mexico, and Fayal.

No. 29.—Baskets woven by natives in South and Central American countries.

No. 30.—Javanese feast mat, size 34 by 17 feet.

No. 31.—Tsuzure Nishiki tapestry. This beautiful piece of tapestry 22 feet long, 13 feet wide, represents the religious rites performed at the consecration of the Nikko Temple, and is of silk, woven on a hand loom, a model of which may be seen in Case No. 8. The artist besides successfully portraying the magnificence of that famous temple, has succeeded in delineating in a most successful manner, human figures clad in many differing and peculiar costumes. The procession consists of over 1,500 persons. The principal objects are three Sacred Cars or Portable Shrines decorated with Metallic Mirrors, Birds, Sacred Potals, Tapestries, etc. Each of them used to be carried by one hundred men, and two of them are here represented. Of the groups of men forming this procession, the most noteworthy are a body of guards in full armour, immediately following the first group consisting of the body of Heralds, and the two Daimyo (Princes) specially charged with the superintendence of the celebrations of the occasion.

The building forming the central figure is the famous Yomeimon which is a gate standing before the main building containing the statue of Prince Ieyasu. The Gate is 37 feet high, and the roof is 25x15 feet. Under each of the four corners of the roof is hung a bell of solid gold. The gable is decorated with carvings of rare animals. The inscription on the Tablet on the front of the Gate was written by the 106th Emperor, Goyosei, and the characters are of pure gold. The upper part of the pillars supporting the second story have carvings of Dragons, gold and white, while the lower parts are decorated with Lions. The pillars are twelve in number, of which the one here represented as standing in the centre of the rear, is called the Inverted Pillar; the carvings of wavelets upon it are upside down. The explanation given is "that perfection being sure to be accompanied with waning, that pillar has been intentionally inverted so as to prevent any further diminution of the grandeur and perfection of that building." On the railings are carved human figures, birds, animals, treasures, and musical instruments. Brilliant figures of birds and flowers decorate the walls of the partitions on either side of the gate, as

well as the roofed fence on both sides which is over 360 feet long when extended in one line. The amount of labor spent on its manufacture can be judged when it is stated that a single face is the work of from three to ten days. Over four years, it is said, were spent in the production of this beautiful tapestry.

No. 31. A.—Chair seat of woolen and silk tapestry, exact counterpart of the French Gobelin weaving.

The second piece done in America and woven by Mlle. Foussadier for Wm. Baumgarten & Co., New York. Made January, 1894.

The looms used in the production of this tapestry were made in New York, the harness being made of American twine; the woolen yarns and silks are native also, while the bobbins and combs are of home manufacture. M. Foussadier, the father of the weaver, and his son, dye all the woolen and silk themselves with the most primitive arrangements.

It is intended that this branch of tapestry weaving shall, in time, become a great American industry.

No. 32.—Turkish rugs.

No. 33.—Persian prayer rug, size, 14 feet 10 inches long by 10 feet wide. The coloring of portions of this rug is most peculiar and it is claimed by experts that the art of preparing some of the dyes used, has been lost.

It will be noticed that this rug is composed of twelve panels, each of which is a complete rug of similar but different design and coloring. It is stated by the donor that this rug has done service for several hundred years in Persian Mosques,

No. 34.—Spinning wheel (hand power).

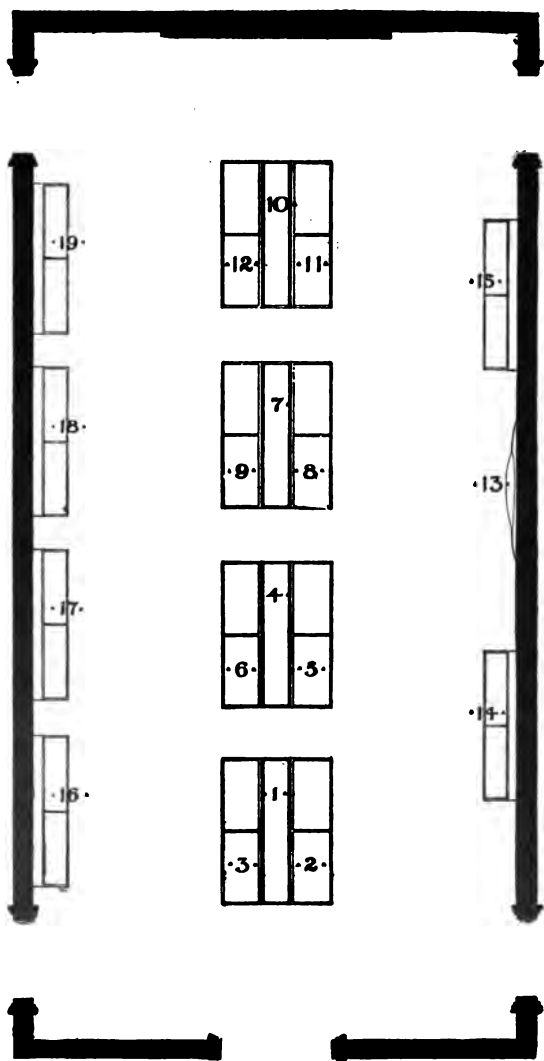
No. 35.—Spinning wheel (foot power).

No. 36.—Glass cylinders of woolen and cotton waste.

No. 37.—Specimens of mattings.

No. 38.—Specimens of mattings.

No. 39.—Mexican colored hemp hammock.



PLAN OF HALL 32.



HALL 32.**MIGNIBOTHAM HALL.****SECTION OF GEMS AND JEWELS.**

The collection of gems and precious stones that during the Exposition attracted so much attention at the Tiffany pavilion in the Manufactures Building, and in the gallery of the Mines and Mining Building, has been added to and occupies the central cases in this hall. It is believed to be the most complete collection in existence, for it contains nearly every known gem or precious stone, in the finest cut examples, in fine crystals, cleavages or rolled grains, always of gem value. Many of the objects in the collection are of historical interest and of world-wide reputation.

The collection as a whole illustrates the Oriental, Cingalese, Aztec, English, German, French, and other methods of cutting, polishing, and engraving gems and precious stones.

Case 1.—(top case).—Contains several of the more handsome objects selected from the classified series to show the methods adopted by skillful jewelers in the fabrication of gems and ornamental stones into articles for use or ornament.

A large jewel casket composed of twenty-six engraved crystal slabs mounted in jeweled and enameled silver; style seventeenth century; original in Ambras Collection, Vienna.

Screen, "The Finding of Moses," engraved on a thin section of rock crystal 9 3-5 inches in diameter, believed to be the largest section of its kind in existence.

Tazza of quartz, engraved to represent a marine festival.

Rhodonite jewel casket, rhodonite ink stand, and rhodonite coupes of rare marking, all from the Ural Mountains. Rhodonite is a favorite stone with the imperial family of Russia.

Three fruit pieces made at Ekaterinburg, Asiatic Russia, composed of twelve varieties of rare gem stones found in the Ural Mountains, and carved to represent plums, currants, berries, and other fruits; a most realistic group.

Ornamental jasper tablet containing view of ruins of the Roman Forum in mosaic, composed of many varieties of precious stones of exquisite coloring.

Pair of handsome jasper coupes from Russia.

Cane of solid silver, inlaid with discs of turquoise, from Kurdistan, S. W. Asia.

Case 2.—The diamond engraved by De Vrees of Amsterdam, shown in 1878 at the Paris Exposition, which required all of the engraver's spare time for five years.

A collection of over fifty diamonds in their natural state, and a crystal in the matrix from South Africa.

Gem gravel containing sapphire, chrysoberyl, zircon, tourmaline, and others in rolled pebbles from a Ceylon river bed.

A ninety-nine (99) and a sixty-six (66) karat yellow sapphire (oriental topaz), a fifty-nine (59) karat blue sapphire, also yellow, pink, white, and other colored sapphires. Spinel fine red and blue and other colors.

Tourmalines, of many colors, from Brazil and Maine.

The 352 karat Hope Aquamarine and other fine examples of sea-green, sea-blue, yellow, and other colors of beryl.

The Chilton double terminated emerald crystal, in a matrix of black limestone, from U. S. Columbia.

Richly colored Chrysoberyls, golden beryls and alexandrite, from Ceylon and the Ural Mountains.

Emerald crystal six inches in length and about a half inch in diameter, remarkable for its length, from Alexander county, N. C.

Beautiful beryls from Maine, Russia and Brazil, also strings of turquoise beads made by the Indians of Santo Domingo, N. M.

Case 3.—Blue topaz, smoky quartz of fine cutting and exquisite luster, albite, and orthoclase, from the Ural Mountains, also colored topazes, Asiatic Russia, Brazil, Ceylon and Colorado,

A very complete series, of garnets, rough and polished, rose, hyacinth, orange and red; also richly hued polished zircons.

Case 4.—Considered the best and most complete collection of quartz and quartz cuttings in the world, notably:—

Large crystal sphere from the summit of Mt. Antero, Colorado, believed to be the largest crystal ball ever polished.

A group of crystal balls mounted on a stand of metallic leaves, the whole representing fruit and foliage.

A quartz crystal scratched so as to show the method of slicing quartz in the manufacture of spectacle lenses.

A series of fourteen specimens of crystal intended to show the various steps in the cutting of a brilliant.

Case 5.—A beautiful collection of the doubly terminated quartz crystals loose and in the matrix from Herkimer county, New York, which are commonly known as Little Falls diamonds.

The peculiar "face" and "owl" agates of Paraguay, South America, grotesquely cut to resemble owls and human faces.

Fine examples of cut crystal from Asiatic Russia; seal having a Turkish inscription on one end and a Russian on the opposite, a head of a horse, and a bust of Ivan Turgeneff.

A cut crystal from Mexico, the finest specimen of aboriginal work of this kind ever found in that country.

Rock crystals from Madagascar, Brazil and Ural Mountains.

Case 6.—Cut amethysts believed to be the finest collection in existence.

Spanish topazes, a fine series. In the "Spanish topaz" the original coloring of the carbon in the smoky quartz has been changed by the action of heat to the rich hues so much admired.

Cut and uncut smoky quartz from Colorado, Ural Mountains and Switzerland.

The finest specimen of hydrolite known (the bubble of symmetrical shape being two and one-half inches in diameter), together with many beautiful and rare specimens of agate and chalcedony, cut and uncut from many parts of the world.

Case 7.—Beautiful specimen of crystallized apophyllite from Mexico, a magnificent piece of labradorite and a very beautiful specimen of Iron Pyrites.

Case 8.—Fine specimens of mocha stones, and moss agates, of beautiful markings; jasper and tiger-eye of rare luster.

Opals in the natural state, also engraved and polished, from Russia, Queensland, Mexico and Washington State, including the famous Sun God Opal from the Hope collection, which is said to have been known in a Persian Temple for three centuries.

Interesting cut specimens of iolite, wollastonite, titanite, kyanite and prehnite.

Case 9.—Fine collection of crystallized Amazon stone from

Pike's Peak, containing several unique specimens of twin crystals, superb moonstones from Ceylon.

A series of thirty-seven obsidian flakes from Mexico showing every step taken by the Aztecs in fashioning a stone implement by splitting and rubbing.

A superior collection of jade implements and ornaments from China, Mexico and New Zealand.

Case 10.—Fluorite from Derbyshire and Cumberland, England, one group being encrusted with calcite crystals. Two specimens of antique carving of lion's feet in marble from Rome, Italy. Two large pearl oyster shells from the west coast of Australia, which together weigh 151 55-100 ounces.

Cases 11 and 12.—Gems cut from the so-called "minerals of the rarer earths," samarskite, gadolinite, allanite and euxenite, also magnificent groups of diopside, the rarest ore of copper; an interesting series of malachite and azurite from Arizona, a series of cut fluorites, fine specimens of ambèr, both rough and polished, from Prussia and Sicily. A collection of abalone pearls from California and unio pearls from Wisconsin, Tennessee and Texas.

No. 13.—Large shield of steel and gold upon which are illustrated scenes in the Norse legend of Frithiof and Ingeborg.

Cases 14 and 15.—Collection of cameos and intaglios, fine examples of the glyptic art. Those specimens to the left of case 15 were cut previous to 500 A. D. Those to the right were cut subsequent to that date. Among the stones used are red jasper, carnelion, onyx, chalcedony, sardonyx and smoky quartz.

Wall Cases 16, 17, 18 and 19.—These wall cases contain the Tiffany Collection of India jewelry, and form the most complete series ever exhibited in any museum. Many of the pieces are very old, of rare forms, consisting of rings, armlets, bosom ornaments, surah holders, ornaments for the forehead, hair, ear, waist, ankles, upper arm, etc., together illustrating the remarkable variety of the ornaments and of the jeweler's handicraft practiced in India for more than 2,000 years. The collection is divided into three sections:

First: Objects made from pure unalloyed gold, as worn by the higher caste only, containing diamonds, rubies, emeralds, sapphires, pearls, garnets, rock crystals, etc., and embellished with rich red and green enamels peculiar to the Indian work.

Second : Collection of silver jewelry consisting of many large and beautifully wrought pieces worn by a lower caste.

Third : Base metal jewelry, worn by the lowest caste only.

The gold jewelry is from the cities of Delhi, Bijapore, Gujarat, Gwalior, Rajputana, Amritsar, Jeypore, Baddhi, Muttra, Bombay and Goa, with some excellent examples of Brahman work.

The Delhi jewelry consists principally of necklaces and head ornaments of gold set with diamonds, pearls, rubies, emeralds, garnets, turquoises and crystal, is characterized by the great number of pearls used, and the frequency of small emerald pendants as decorations.

The jewelry of Gujarat is characterized by the large quantity of gold and small number of jewels used.

That of Rajputana resembles the jewelry of Delhi, but is heavier and less delicate.

In that from Jeypore is an abundance of enamelling.

That of Baddhi is distinguished by the number of small gems used, one necklace containing 492 rubies and 82 diamonds.

The necklaces of Kathiawar greatly resemble those of Delhi though containing less enamel.

The jewelry of Bombay is remarkable for the few gems used and the great delicacy and artistic feeling shown in the gold work.

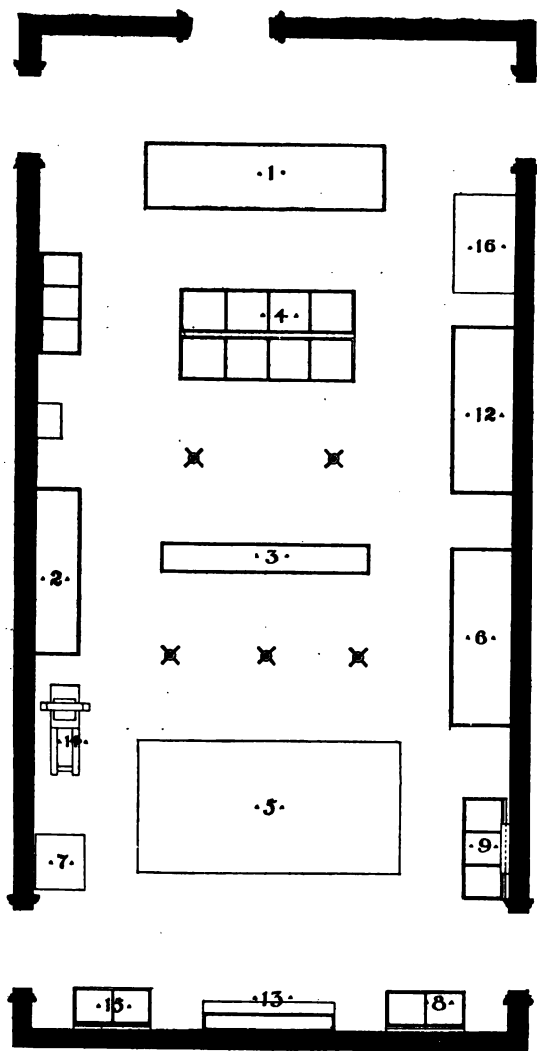
The collection of silver jewelry contains many beautiful designs and fine examples of the ingenuity displayed by the oriental silversmiths in joining together the simple parts which united make a symmetrical whole.

The jewelry of base metal worn by the lowest caste while quite heavy is artistically designed, the ornamentation differing in great degree from that employed in silver and gold work.

The silver work is from the cities of Gujarat, Rajputana, Amritsar, the Deccan district, Lahore and Bombay.

The jewelry of base metal is mostly from the State of Gwalior.

This collection also contains two large and handsomely designed maces of solid silver which were carried in advance of a Maharajah by his attendants on all state occasions. The most prized possessions of a Maharajah are his maces. He may lose his jewels, his money, his lands and his friends, but very seldom is he willing to part with the emblems of his authority, consequently very few maces have ever been brought out of India.



PLAN OF HALL 33.

HALL 33.

SECTION OF MISCELLANEOUS INDUSTRIES.

In this Section of Hall are many objects of interest which do not properly belong to any of the Sections of the Museum so far created.

Case 1.—A valuable series of 65 specimens of flours, meals, etc., manufactured from the staple cereals.

Cases 2 and 12.—Articles manufactured of wood; plain, engraved, carved, and ornamented.

Case 3.—Curious objects.

Case 4.—The nucleus of a collection, which, when expanded, will illustrate the history of paper making and book and map printing and pictorial illustrations by the multiplying process.

Case 5.—Models and originals showing the development of the manufacture of the piano.

Case 6.—Series of models showing the various steps in the invention and perfection of the McCormick Mower and Reaper.

Case 7.—Old cannon, rifles, and shotguns.

Case 8.—Metal work made by scholars in a Russian training school.

Case 9.—Models of gun powders of various qualities.

No. 10.—Examples of Japanese lacquer work.

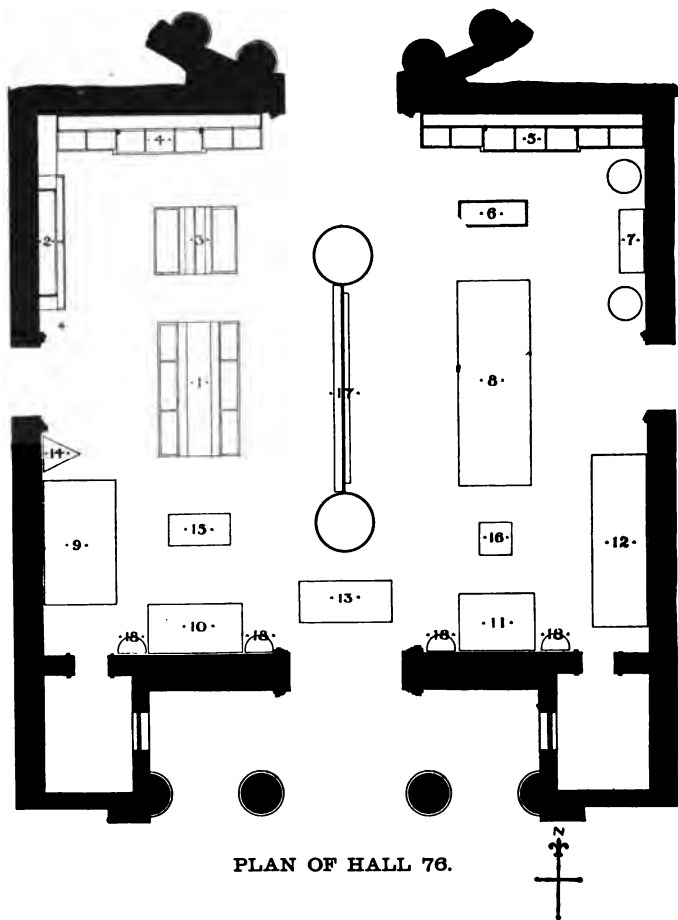
No. 11.—Japanese screens and partitions of paper, strengthened with wood or bamboo.

Case 13.—A collection of Antique Musical Instruments.

No. 14.—Old press, similar to those in use in the days of Franklin. This press was used by Ramage, the great artist and engraver.

Case 15.—Glass cutters and emery grinders.

Case 16.—Government Collection of Concentrated Feeds for Animals.



PLAN OF HALL 76.

HALL 76, WEST PAVILION.**SECTION OF METAL-WORKING INDUSTRIES.**

The Metallurgical Collection is rich in examples of the great work done by the iron founders and metal manufacturers of Germany, Sweden, Spain, England, and America.

Many of the best objects from the great Stumm exhibit, including the Statue of Vulcan in the East Court, are preserved in this Section.

Case 1.—An interesting exhibit of English Saw plates, Gear wheels, Wrenches, Cutters, and large Steel Castings from the firm of Jessop & Sons. In the lower part of the Case are large pigs of iron from Norway and Sweden, also crushed wheels and twisted bars of iron and steel.

Case 2.—Sections of steel bars, rails, and structural beams, from Spain, donated by Sociedad de Altos Hornos y Fábricas de Fierro y Acero de Bilbao. (The Society for the manufacture of high grade Iron and Steel, Bilbao).

Case 2A.—Scrap iron collection made by Swartz Iron & Metal Co., Chicago; a collection of all grades of scrap iron, steel, and metal. Also the finished product after its first heat, and sample of the iron when finished. It contains samples of different grades of iron and metal as it is sorted on leaving the scrap iron dealer's yard.

Case 3.—Samples of stone and marble which have been cut and polished with crushed steel; also specimens of the steel used in the process.

Cases 4 and 5.—Sections of rails and beams from the factory of Gebr. Stumm, Germany. In this Case is illustrated the method of crushing a number of bars of iron into one solid beam. A number of fractures of rails, beams, and bars are also shown.

Case 6.—A number of examples of fractures of steel and pig iron, showing the grade and quality of the metal.

Case 7.—Samples of wire, wire rope, and cable.

No. 8.—Exhibit of bent and twisted beams from the factory of Stumm & Co., exactly as exhibited by them at the Columbian Exposition.

- No. 9.**—Model of Chandler Iron Mine in Minnesota.
- No. 10.**—A model of rail rolling mill.
- Nos. 11 and 12.**—Models of annealing furnace and rolling mill for making structural iron, donated by Stumm & Co.
- Nos. 13 and 14.**—Tool steel bars from the Avesta Steel Works, Sweden.
- No. 15.**—Rims for locomotive wheels, and a solid steel shaft eight feet long, and examples of twisted tram-car axles and bars.
- Nos. 16 and 17.**—Bars and twisted pieces of iron and steel from Avesta Steel Works, Sweden.
- No. 18.**—Complete Reciprocating Rock Drill.
- No. 19.**—Dumping ore car used in modern iron mines.
- No. 20.**—Model of a Hot Air Blast furnace.

HALLS 37, 38, 39, 40, 55, AND 54, EAST PAVILION.

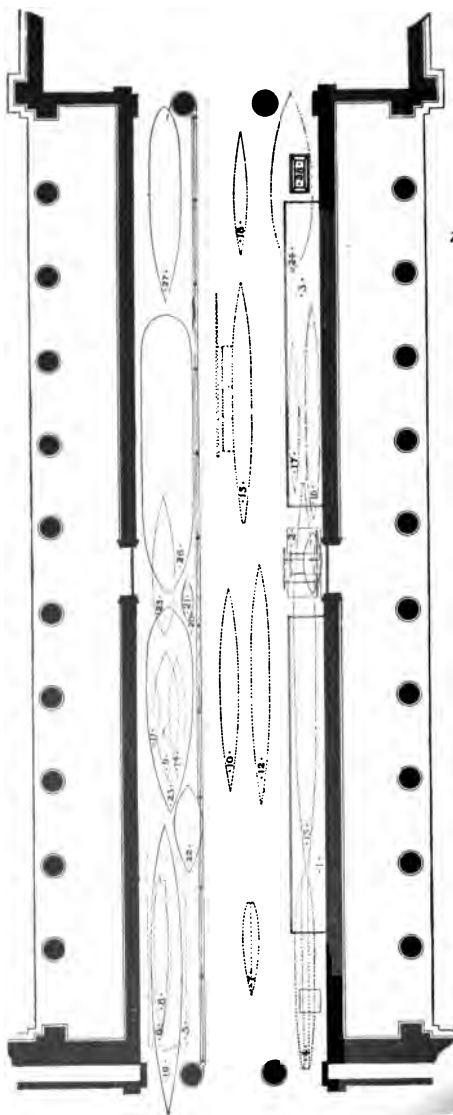
SECTION OF TRANSPORTATION.

Nearly three hundred years have passed since Lord Bacon wrote the lines, made more famous from the fact that they were inscribed upon the Golden Door of the Department of Transportation Exhibits of the World's Columbian Exposition, "There be three things which make a Nation great and prosperous—a fertile soil, busy workshops, and easy conveyance for men and goods from place to place."

It has been said that "The wheel is a dial by which can be reckoned the degree of progress of every civilization. When people learn how to make use of it, the crooked ways are made straight, the rough places smooth. Footpaths are replaced by level highways, bridges are built over streams once forded, intercommunication is accelerated, commerce is stimulated, and a rapid national development follows."

In the Section of Transportation all methods of marine and land conveyance are included, except the steam railway, which may be regarded as the culmination of the several series installed in the six Halls above enumerated. The exhibits are arranged in the order of development, beginning with the floating log and the human burthen-bearers and pack animals, continuing through methods of utilizing man and animals for traction, sledges and vehicles with wheels, and concluding with the street (or tram) car, which, when hauled by animals, marked the beginning of the present railway system.

The objects in this section, with very few exceptions, were acquired from the Department of Transportation Exhibits, World's Columbian Exposition.



PLAN OF HALL 37.

HALL NO. 37.

A. MARINE TRANSPORTATION.

In this Hall are installed an interesting series of original boats and models, illustrating various methods of marine conveyance, floating with the tide, towing by man and beast, propulsion by pole, oar, and sail.

Case 1.—Models illustrating the progress of improvement in primitive craft, beginning with the Chatti, or fisherman floating upon an earthen jar, and including various boats propelled by poles or oars. Other important objects are the Cingalese catamarans and outrigger canoes; the poorinda, a barge of state from Kashmir, India; an Imperial caique, the state barge of the Sultan of Turkey; the Mohr Punkee, or Peacock boat, of the Ganges, used by the Rajas and wealthier Hindoos as a pleasure boat; a barge from Burmah; state barge of the Governor of Kashmir, India; and finally the state barge of the Boa or Emperor of Burmah, a handsome boat with beautiful hand carvings.

Stand 2.—Upper boat. Yattrava or Dhoney. Model about one-thirtieth full size. Colombo, Ceylon. A decked vessel with outrigger and lugsails, used for transportation purposes on the sea. Usually manned by a crew of six men.

Lower boat. Orua. Model one-eighth full size. Fishing boat with outrigger, with lug sail, from Ceylon.

Case 3.—Models of oriental boats propelled by sails, beginning with the log raft, equipped with primitive sail; followed by the heavily laden Hindoo trading vessels moving by wind, and concluding with the great freight junk of the China coast—the highest development of the Asiatic sailing vessel. Among the many interesting objects in this case are East Indian cargo boats with loads, illustrating the Hindoo methods of combined sailing, rowing, and towing against the current; the Loungo and Louzgat, Burmese freight boats for transporting produce; the Likin, or Chinese revenue cutter, and an extensive series of junks that ply along the China coast.

No. 4.—Catamaran, or raft (original), from Colombo, Ceylon. This was formerly used for transporting the royal mails from Colombo, coastwise, about the island.

No. 5.—Bimba (original), a catamaran, or raft with sides. St. Paul de Loanda, Angola, Africa.

No. 6.—Balsa (original), boat made of rushes, Lake Titicaca, Peru. Used for general transportation purposes. Owing to its light draught large cargoes are often carried.

No. 7.—Balsa (original), boat made of rushes, Lake Titicaca, Peru. Used for transportation of one person only.

No. 8.—Cabilleto (original), fishing boat, made of rushes Huanchaca, Peru. Used in fishing, especially in heavy surf. The occupant kneels just abaft amidships of this boat and propels it by means of a short, broad-bladed paddle.

No. 9.—Donga (original), from Benguela. Africa. A very primitive dugout. The addition of the strip along the gunwale is one of the earliest efforts to increase height of sides of the boat.

No. 10.—Dugout (original), from Seneca Indian Reservation, New York. Typical dugout of the Indians of the interior of the Northeastern United States.

No. 11.—Dugout (original), for carrying two persons. Colon, Colombia, South America.

No. 12.—Corial (original), made by the Accawoi Indians, headwaters of the Demerara river, British Guiana, South America. This is the highest type of dugout canoe made by savages of any country, and is not patterned after the craft of any civilized race.

No. 13.—Tlo (original), a dugout for fishing purposes, made by the Bella Coola Indians, near Fort Wrangel, Alaska.

No. 14.—Dugout (original), from the headwaters of Rio Ozama, San Domingo. Made by Indians, but showing European influences in both exterior and interior form. Used by natives in transporting produce from the upper river to the coast towns.

No. 15.—Surf Canoe (original), with outrigger, Apia, Samoa. Used for general transportation and fishing where surf is heavy.

No. 16.—Woodskin (original), made by Accawoi Indians on headwaters of Rio Essequibo, British Guiana, South America. The most primitive form of the bark canoe.

No. 17.—Birchbark (original), Upper Yukon River, Alaska. The highest type of bark canoe made by savages are made by the Indians of North America.

No. 18.—Kyak (original), a decked skin boat used by Esquimaux of America, Asia, and Europe in hunting and fishing. Port Clarence, Alaska.

No. 19.—Caique (original), or row-boat. Constantinople, Turkey. A pleasure boat.

No. 20.—Stand. Model of fishing boat used near Curacao, Danish West Indies.

No. 21.—Model of punt, or scow, used for ferrying and general transportation purposes in the harbor of Curacao, Danish West Indies.

No. 22.—Stand. Model of fishing boat of the type used on the Sea of Gallilee in time of Christ. The model was made in Syria.

No. 23.—Daighsa (original). Locally called "Bumboat" by English sailors. Daighsas are used sometimes for pleasure, but generally by Jewish merchants who peddle produce and fruits around Maltese harbors. Hence the inscription upon the seat-back in the stern-sheets: "Heartily, wishing, all, sort, of, wealth, to, mankind, and, that, I, may, have, chance, to, live, honestly, with, same." Valetta, Malta.

No. 24.—Clinker built fishing boat (original), used in the cod fisheries of the Lofoten Islands. From Bodoe, Nordel, and Norway.

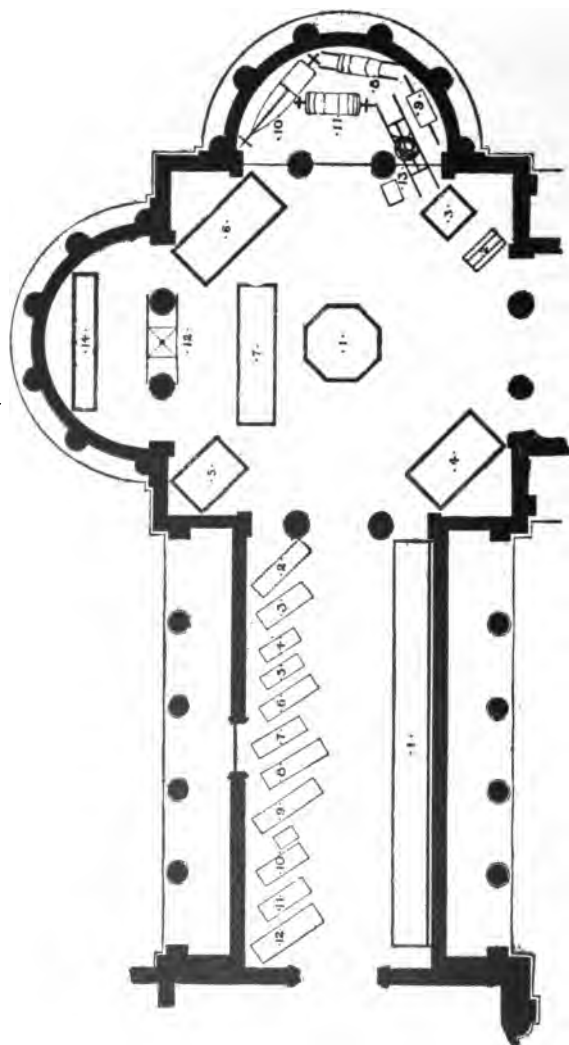
No. 25.—Dugout, with sail (original). Colon, Colombia South America.

No. 26.—Bragazza (original). A carvel-built two-masted fishing vessel of Venice, Italy. The sails are artistically painted, showing the survival of ancient Phoenician art influences among the Adriatic fishermen. On the foresail the inscription runs: "Peace to thee, St. Mark, my evangelist."

No. 27.—Single-masted pleasure boat (original), from Arendal, Nedenaes, Norway. Ornamented at stem and stern by hand carvings. Clinker-built.

No. 28.—Stand. Wooden model of the "Santa Maria." A piece of wood from each Exposition Building (except concession stands), erected before May 1st, 1893, in Jackson Park, is incorporated in this model, which is made to an exact scale.

On the North and South Walls are hung pictures from the West Coast of South America, from Africa, Asia, and the United States—illustrating many primitive and other craft, including types of the highest development of wooden-bottomed American sailing vessels.



PLAN OF HALLS 88 AND 89.

HALL 38.**B. HUMAN BURTHEN-BEARERS.**

Case 1.—Indian, from Colombia, South America, (life-sized figure), carrying a Silla, or traveling chair, in which is seated an American on his way from the coast to Bogota, the capital.

Case 2.—Models of thirteen Cargadores, male and female, illustrating the primitive methods of transportation which prevail in Latin-America.

Case 3.—Negro woman "toting," Southern United States, (life-sized figure). Carrying objects on the head is a common method in the South.

Case 4.—Male and female Indian Cargadores (life-sized figures), transporting goods from Guayaquil, the seaport, to Quito, the capital of Peru.

Case 5.—Porter (life-sized figure) in a street of Constantinople, transporting a case destined for the Columbian Exposition.

Case 6.—Three peddlers (life-sized figures), walking abreast along a street of Constantinople, Turkey, carrying milk, bread, and water.

Case 7.—Sedan chair containing a wealthy lady, who is being transported from one part of Constantinople to another, by two carriers. (Life-sized figures.)

No. 8.—Fillijan, a primitive Palanquin, Antananarivo, Madagascar.

No. 9.—A Maxilla, or palanquin, from Saint Paul de Loanda, Angola, Africa.

No. 10.—A traveling Hammock, Funchal, Madeira.

No. 11.—The Palanquin which Mrs. French-Sheldon used as a carriage, a boudoir, and a drawing-room during her explorations in Eastern Africa.

No. 12.—Sedan chair used by the ladies of Bogota, Colombia.

No. 13.—Fire extinguisher, with Sergeant of the Fire Department, Constantinople, Turkey.

Case 14.—Models of Sedan Chairs from China (the home of the sedan chair) and from India; also models of Hindoo porters carrying bales, etc.

HALL 39.**C. PACK ANIMALS.**

Burthen bearing by animals is illustrated by a full series of pack animals and saddles. The animals, equipped for the journey, stand on the East side of the Hall, and the saddles in a case opposite. Among the most interesting are the pack-saddle of Syria on the Camel; the pack-saddle with bales, accompanied by an Arriero, or mule driver, of Bogota; the Lechera, or woman milk peddler, of Ecuador, and the Vaquero, or cattle herder, of Colombia, South America.

Case 1.—In the saddle case are shown different stages in the development of pack and riding saddles, including a specimen of the primitive American pack-saddles, with esteraltas, or plantain saddle pads; the skeleton saddles of the Cheyenne warriors; various Turkish saddles, including the beautiful one formerly used by the Sultan; three very handsome Latin-American saddles, including one heavily ornamented with solid silver, and two specimens of Asiatic harness. On the walls are pictures of pack animals from Mexico, South America, West Indies, and Persia.

2.—Camel with pack-saddle, showing method of transporting goods across the Syrian desert.

3.—Llama, with blinds, transporting portmanteaus, Peru.

4.—Llama, with blinds and panniers, such as are in common use in Peru, Bolivia, and Ecuador, South America.

5.—Burrito (or young burro). Peru, South America.

6.—Donkey, with rush saddle, carrying water jars. Jerusalem.

7.—Burro, with rush saddle; the most important beast of burthen in all Latin-American countries. Peru, South America.

8.—Donkey, with Syrian bridle and pack-saddle. Jerusalem.

9.—Burro, with pack-saddle of plantain leaves. Peru.

10.—Mule, with pack-saddle loaded with two bales destined for Columbian Exposition, accompanied by an Arriero, or mule driver. Bolivia, South America.

11.—Lechera, or woman milk peddler. Ecuador.

12.—Vaquero, or cattle herder, equipped with twisted raw-hide lariat and rope tether and mounted on a mule. Colombia.

HALLS 40 AND 55.

D. LAND VEHICLES.

In Halls 40 and 55 are installed vehicles from widely separated portions of the earth. The most interesting are the dog-sleds of Arctic America, and the sledges of sub-tropic Madeira, where the snow never falls; the Etruscan racing chariot, with wheels differing from Assyrian and Egyptian chariots in number of spokes; the rolling hogshead, a relic of Colonial days, and the Mexican cart with solid wheels without spokes, illustrates the introduction of the wheeled vehicle in civilization. The decorations of the Sicilian cart are of a religious nature, as might be supposed. The Volante, a Cuban carriage for two persons, is generally drawn by two horses, the leading horse being almost in front and a little to the left of the wheel horse. A series of models of Hindoo and Burmese wagons and carriages, and Ceylon carts is in the wall case. Snow shoes, from Norton Sound, Alaska.

No. 1.—Skis, wooden snow shoes from Norway. Skis are used for mountain travel in Scandinavia and Alaska.

No. 2.—Snow shoes from Norton Sound, Alaska.

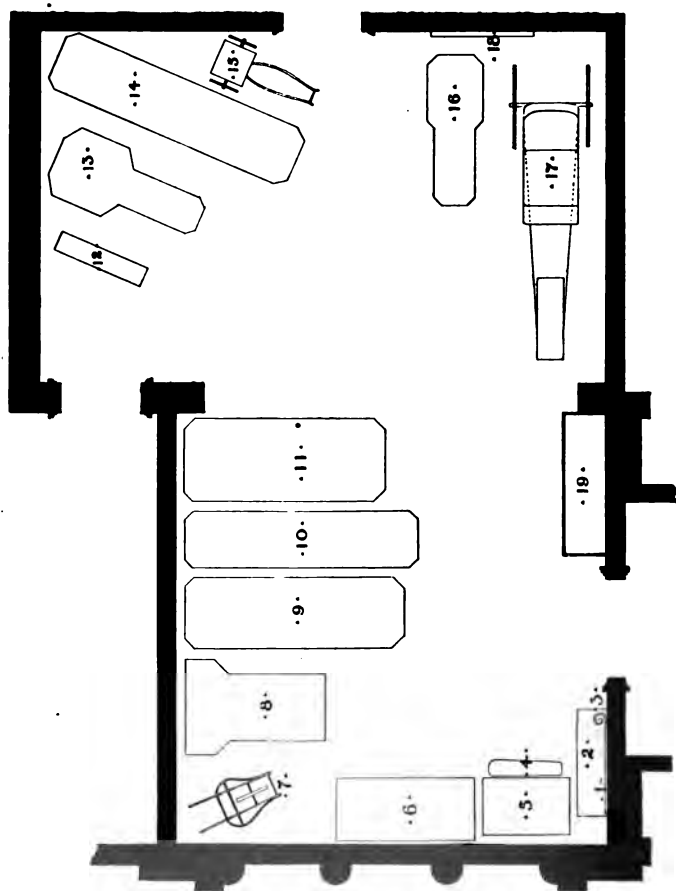
No. 3.—Dog sled, with bone shoes and sealskin harness. Smith Sound, Greenland.

No. 4.—Dog sled. Port Clarence, Alaska.

No. 5.—Toboggan, with harness, drawn by dogs. Norton Sound, Alaska. On wall.

No. 6.—Corca, or freight sled, Funchal, Madeira: drawn by bullocks. Though the snow never falls in Madeira, the only vehicles drawn by animals are sleds.

No. 7.—Carro de Monte, or mountain sled, Funchal, Madeira. Made of rattan, and finished in red cloth and mahogany.



PLAN OF HALLS 40 AND 55.

No. 8.—Carro dos Boss, or mountain sled, with canopy, Funchal, Madeira. Intended for four persons.

No. 9.—Passenger wheel-barrow, Amoy, China. Used to transport travelers from point to point within the city. The passenger places one foot against the front cross-bar, allowing the other to swing free, and rests one arm on top of the wheel shield.

No. 10.—Racing chariot. Replica of the type used in Etruria.

No. 11.—Rolling hogshead, with yoke of oxen and negro driver, as used in Virginia in Colonial days to transport tobacco from the plantation to the Jamestown and Richmond markets.

No. 12.—Palanquin for passengers, transported by mules. A common mode of conveyance in the Orient. Jerusalem.

No. 13.—Carreta ox cart, wheels without spokes, made by the Indians of the Pueblo of Acoma, New Mexico, with pair of oxen yoked according to the Mexican method.

No. 14.—Gour ox, used as a draught animal in India.

No. 15.—Red River cart and harnessed ox. The only method of transporting goods northwest of St. Paul, Minnesota, previous to 1871. In the early days oxen only were used, but now ponies have displaced them. One pony often draws a load of from 800 to 1,000 pounds over the prairie.

No. 16.—Araba Codja, a country carriage drawn by a pair of oxen, Constantinople, Turkey. The gaudy harness and hangings make this a most picturesque specimen.

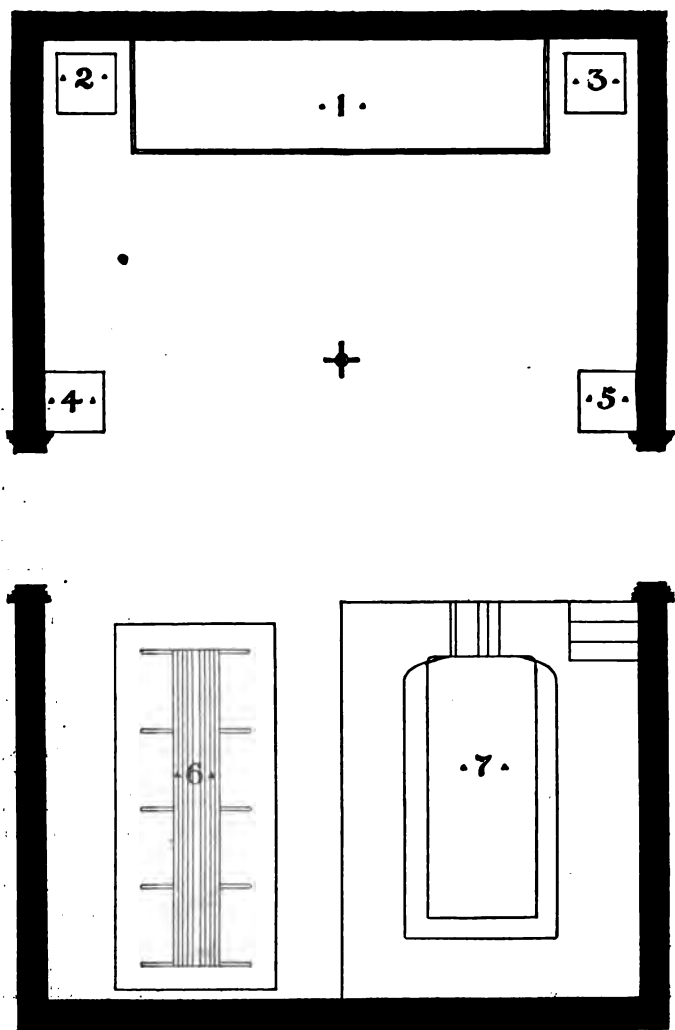
No. 17.—Gharri, drawn by man, Surat, India. Largely used for transporting goods within the city.

No. 18.—Pleasure cart for holy-day use, Palermo, Sicily, with donkey and ornamented harness.

No. 19.—Volante, a carriage in common use in Cuba. Drawn by two horses. A postilion rides the leader, and the passenger drives the shaft horse.

No. 20.—Bent and turned wood of all descriptions used in wagon building, from various sections of New South Wales, Jamaica, and the United States, on wall.

Case No. 21.—Models of Ceylon carts used for freighting, and Turkish, Hindoo and Burmese wagons drawn by bullocks and horses. Model of an American cart.



PLAN OF HALL 54.



HALL 54.**STEAMBOAT AND STREET CAR.**

In the hall devoted to the Steamboat and the Street Car is a model of an Ohio river steam tow boat, with a large tow of coal barges; also a complete model of a Mississippi river steamer towing a large raft of Minnesota logs, a method of timber transportation rapidly passing away.

At the opposite end of the hall stands the first grip-car ever run in passenger service. This was built under the direction of Mr. A. S. Hallidie, and used on the Clay Street Railroad of San Francisco, California, in the year 1872. Another holds specimens of steel used in the operation of cable and electric roads in Germany.

On the walls of this hall are many pictures representing steamboats and street cars of various countries, including steamboats on Lake Titicaca, Peru. This lake is the highest navigable body of water on the earth, and the steamboats which ply upon it are made in sections and transported up the mountains on the backs of mules.

Case 1.—Model of a raft of logs on the Mississippi river being towed by the stern-wheel steamboat "Juniata." The steamboat is hitched to the raft bow on, and by means of guy-ropes run to the nearest corners of the tow, the steamboat is made to direct the course of the raft. The model of the steamboat is of metal. The model of the raft is made of white pine branches, cut in northern Wisconsin. Both boat and raft are constructed on $\frac{1}{4}$ -inch scale.

Model of a steam tow-boat, with a large tow of coal, representing the method of transporting coal from Pittsburgh to New Orleans. The larger barges carry the freight, and the small ones the coal for steamer fuel. The steamer represented is 200 ft. long and 42 ft. wide, with cylinders 24 inches in diameter, and 12 ft. stroke of piston, and 7 boilers. The barges are each 130 ft. long, 25 ft. wide, and $7\frac{1}{2}$ ft. deep, each carrying about 13,000 bushels of coal. The steamer and tow, when running, occupy a space of 700 feet long and 150 feet-wide.

No. 2.—Statue of Fulton.

No. 3.—Statue of Ericcson.

No. 4.—Statue of Papin.

No. 5.—Statue of Watt.

These statues were located at the south front of the Transportation Building during the Exposition.

Stand 6.—Cable and electric street railway track appliances, wheels, wheel sections, rims and spokes, fish plates, rails, rail sections, frogs, and crossings, and ties.

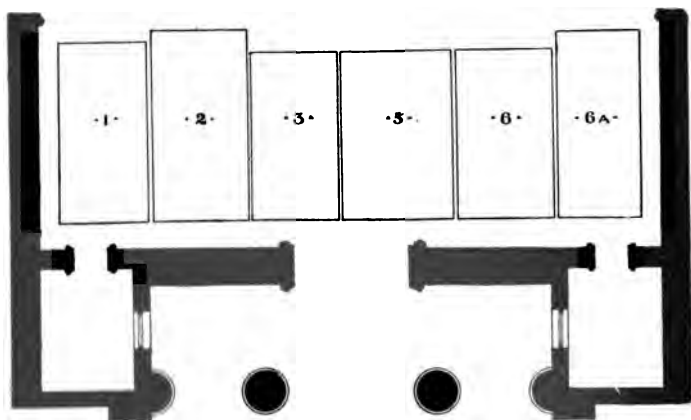
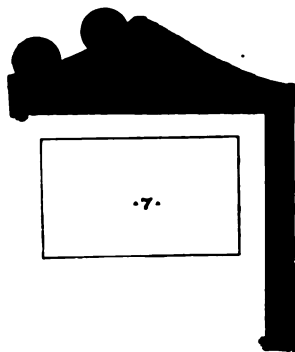
Stand 7.—Represents a section of Clay Street, San Francisco, in 1872. On this street was placed and operated the first cable railroad of the world. A section of the cable road, including original yokes and rails, and the first grip-car run for public use on any cable street railway. On the stand are specimens of original yokes and the first original grip, which was made for Mr. A. S. Hallidie, the inventor of the cable railway, in 1872. A small model of the grip, together with models of two cars, is also here. At the end of the stand are two yokes used on the cable railways of Germany. A large drawing of Stephenson's first street car is also here.

The visitor then enters Hall No. 53 of the Museum of the World's Railway, in which is installed the models illustrating the first experimental steps in the invention of the steam locomotive.

DEPARTMENT OF THE RAIL WAY.

The Department of the Rail Way, occupying the East Pavilion, is designed to illustrate, largely through full-sized reproductions and originals, the evolution and development of Permanent Way, Structures, Motive Power, Equipment, and Appliances. The nucleus of this representation is in the extensive collection made by the Baltimore & Ohio Railroad Company for the Columbian Exposition, and presented in entirety to the Field Columbian Museum. This collection embraces thirty-eight full-sized working reproductions, covering the period from the initial idea of steam propulsion on land, 1680, to the first "Camel" engine of 1848, and nine original locomotives, including examples of the practice followed from 1832 to 1876. In addition there are nearly eighteen hundred uniformly mounted and framed examples in original wash-drawings, detail plans, photographs, prints, and lithographs, illustrating the evolution and development of the railway in every land where the locomotive whistle has been heard.

The interesting collection made by the Pennsylvania Railroad Company for the Exposition is also in the Museum, and it tells in a graphic and instructive manner the story of the progress of this great railroad corporation by series of models and originals. The Baldwin Locomotive Works contributed the full-sized working reproduction of the "Old Ironsides," the first of the Baldwin engines, and the Rogers Locomotive Works the full-sized working reproduction of the "Sandusky," the first Rogers engine. The Philadelphia & Reading Company contributed the "Rocket," the original No. One on that road; the Illinois Central Company the "Mississippi," the original first locomotive in the Gulf States; the Chicago & North-Western Company the "Pioneer," the original first locomotive west of Chicago, and the Mount Washington Railway the original engine, the "Peppersauce," the first mountain-climbing locomotive in the world. The World's Exposition, through the Chief of the Department of Transportation, pre-



PLAN OF HALL 53.



sented to the Museum the "Samson" and the "Albion," the original first and second locomotives in Nova Scotia, together with the original first passenger car in that country and the two original first cars drawn on rails by a locomotive in the world, those from the Merthyr Tydvil tram road in South Wales.

In each instance the engines—the originals and reproductions—stand upon either the original or an exact counterpart of the track of their period.

It is suggested that visitors inspect the Halls in the order in which they are described, as in this manner evolution and development may be followed chronologically. On each original engine, as well as upon each reproduction, will be found cards affording much historical information.

HALL 53.

No. 1.—Full size working reproduction of the "Newton," England, 1680; the first idea of propulsion by steam on land in history.

No. 2.—Full size working reproduction from the measurements and detailed drawings made from the original in the Conservatoire des Arts et Métiers, Paris, of the "Cugnot," France, 1769; the first actual propulsion by steam on land in the world.

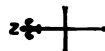
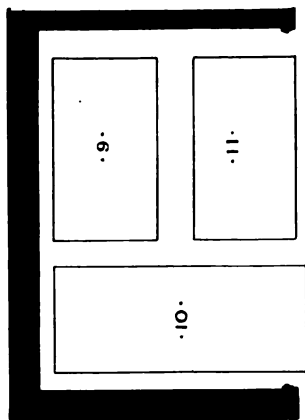
No. 3.—Full size working reproduction of the "Murdoch," England, 1784; first propulsion by steam on land in Great Britain.

No. 4.—Full size working reproduction of the "Read," America, 1790; the first idea of steam propulsion on land on the American continent.

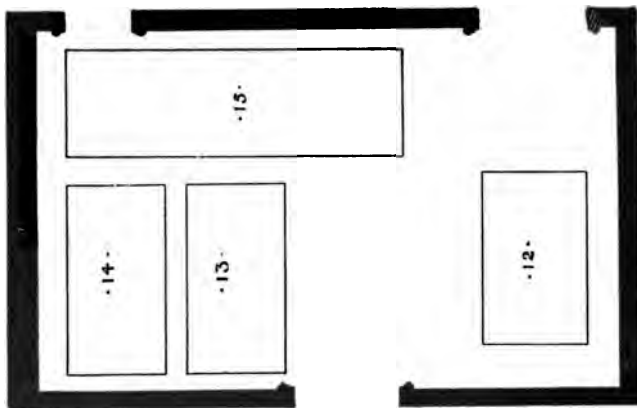
No. 5.—Full size working reproduction of the "Trevithick," England, 1800; the first effort of the father of the locomotive.

No. 6.—Full size working reproduction of the "Trevithick," England, 1804; the first locomotive on rails in the world.

Nos. 6A and B.—In connection with this are two of the first five cars drawn by a locomotive in the world, they having been attached to the "Trevithick" of 1804, on the "Mythyr Tydvil" tram road in South Wales. These are the original cars in their original form, standing upon the original rails, which in turn are upon the original stones laid on the South Wales tram road in 1800.



PLAN OF HALL 51.



PLAN OF HALL 52.

No. 7.—Full size working reproduction of the "Trevithick," 1808, the first locomotive on rails in England.

Upon the Walls, series of original large wash-drawings, indicative of the early stages of the evolution of the locomotive. Also, series of original drawings by Theodore Cooper, showing the evolution and development of the railroad bridge of the world. Also, series of bromides of scenes on railroads in foreign countries.

HALL 52.

No. 8.—Full size working reproduction of the "Evans," America, 1804; the first actual propulsion by steam on land on the American continent, and the first practical propulsion by steam on land in the world.

No. 9.—Full size working reproduction of the "Blenkensop," England, 1812; the first locomotive for actual commercial purposes in the world, it running on a rack road.

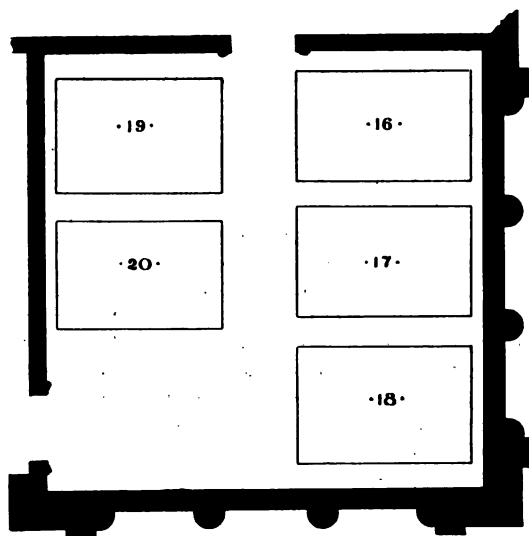
No. 10.—Full size working reproduction of the "Brunton," England, 1813; the horse-leg locomotive.

No. 11.—Full size working reproduction of the "Hedley" model, England, 1813, with which the first practical demonstration of the adhesion of smooth wheels to smooth rails was made.

On the Walls, continuation of the Theodore Cooper series of the evolution and development of the railroad bridge; also a continuation of the large wash-drawings showing the evolution of the locomotive. Likewise, a further series of bromides of railroad views in foreign countries.

HALL 51.

No. 12.—Full size working reproduction of the "Puffing Billy," England, 1813, built by Hedley immediately after demonstrating the adhesion of smooth wheels, this locomotive being thus constructed. The "Puffing Billy" is from the measurements and drawings made by the authorities of the South Kensington Museum in London, the original engine, the oldest in the world, being preserved in that institution.



PLAN OF HALL 50.



No. 13.—Full size working reproduction of the "Blucher," England, 1814; George Stephenson's first locomotive.

No. 14.—Full size working reproduction of the "Howard," America, 1828; the first locomotive patented in America.

No. 15.—Full size working reproduction of the "Seguin," France, 1827-28; the first locomotive in France, and the first locomotive in the world with a multi-tubular boiler.

Upon the Walls, concluding series of the Theodore Cooper drawings of the evolution and development of the railroad bridge. Also, series of large wash-drawings showing the evolution of the locomotive steam carriage period, and series of views illustrative of railroad operation in foreign countries.

HALL 50.

No. 16.—Full size working reproduction of the "Rocket," England, 1829; George Stephenson's successful locomotive in the Rainhill trial, the first locomotive contest in the world, the reproduction being from the original drawings.

No. 17.—Full size working reproduction of Timothy Hackworth's "Sans Pareil," England, 1829; the first locomotive constructed with steam blast, and also a competitor in the Rainhill trial, the reproduction being from the measurements and detail drawings furnished by the South Kensington Museum, the original engine being in that institution.

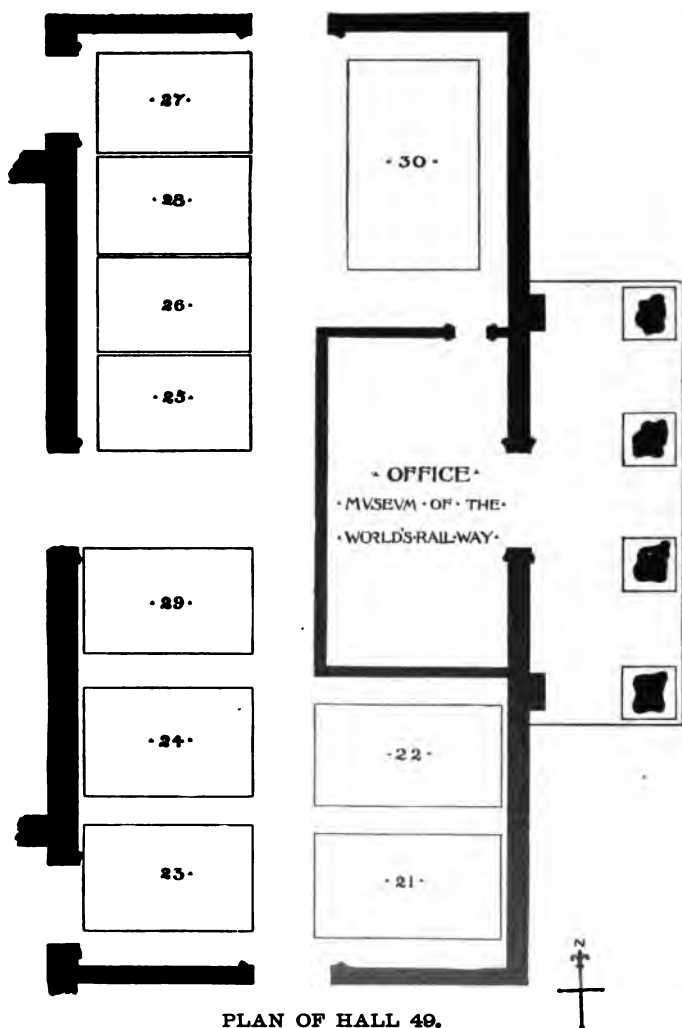
No. 18.—Full size working reproduction of Ericson's "Novelty," England, 1829; the first tank locomotive, and also a competitor in the Rainhill trial.

These three reproductions stand upon the stones, rails, and chairs of the original track upon which the trial took place.

No. 19.—Full size working reproduction of the "Stourbridge Lion," England, 1829; the first locomotive seen in America, it having been imported the year named.

No. 20.—Full size working reproduction of Peter Cooper's "Tom Thumb," America, 1829-30; the first locomotive built on the American continent.

Upon the Walls, continuation of the wash-drawings, showing the evolution of the locomotive of the world. Also, continuation of the series of bromides, illustrating scenes on railroads in foreign countries, and a series of photographs showing modern bridges and railway appliances.



PLAN OF HALL 49.

HALL 49.

No. 21.—Full size working reproduction of the "Best Friend," America, 1830; the first locomotive built on the American continent for actual service.

No. 22.—Full size working reproduction of the "Mercury," England, 1830; George Stephenson's highest type of development, and the father of the standard English engine.

No. 23.—Full size working reproduction of the original "York," America, 1831; Phineas Davis' first locomotive.

No. 24.—Full size working reproduction of the "Johnson," America, 1831; the first locomotive with a double firebox.

No. 25.—Full size working reproduction of the "James," America, 1831; the first suggestion of the link motion.

No. 26.—Full size working reproduction of the "Costell," America, 1831; first locomotive with oscillating cylinders.

No. 27.—Full size working reproduction of the "Child," America, 1831; first rotary locomotive.

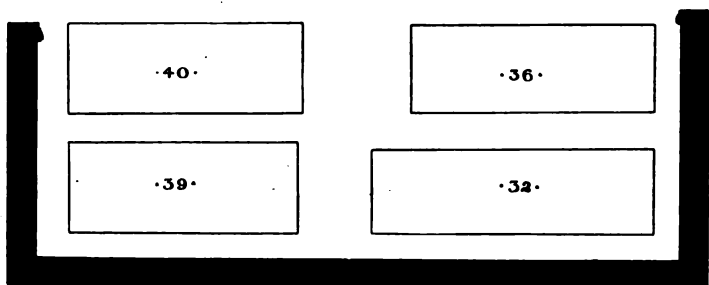
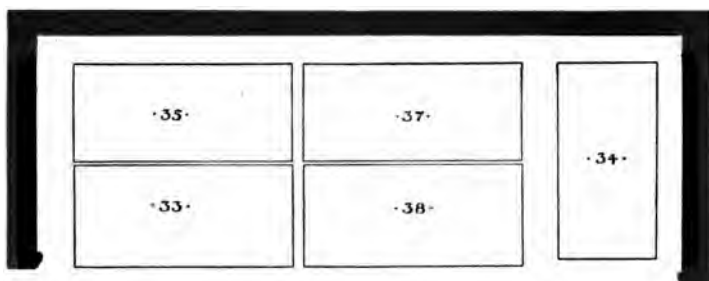
The five locomotives last mentioned were competitors in the Baltimore & Ohio locomotive competition or trial in 1831, the first event of this character on the American continent. The "York" was the winner.

No. 28.—Full size working reproduction of the "James," America, 1832; the first locomotive in the world with link motion.

No. 29.—Full size working reproduction of the remodeled "York," America, 1831; the first of the distinctively "Grasshopper" type.

No. 30.—Full size working reproduction of the "Old Ironsides," America, 1832; the first Baldwin locomotive.

On the Walls, photographs on canvas by Wm. H. Jackson, and retouched by Thos. Moran, of Harper's Ferry, Buckhorn Wall, and Fairport; these photographic results being eight feet high and sixteen feet long. On the East, North, and West walls of this room is a series of original drawings, lithographs, and photographs, illustrative of the development of the Baldwin locomotive from 1832 to 1893; on the walls in the Southern half of the room are a series of original drawings, lithographs, and photographs, illustrating the progress as manufacturers of the Portland Locomotive Works, the New Jersey Locomotive Works, and the Cooke Locomotive Works. Also series of maps showing the railroad occupation of the United States by decades from 1830 to 1890.



PLAN OF HALL 56.



HALL 56.

No. 32.—Full size working reproduction of the "South Carolina," America, 1832; the first double end locomotive in the world.

No. 33.—The "Atlantic," America, 1832; original engine, and the oldest locomotive in its original form on the American continent.

No. 34.—Full size working reproduction of the "Experiment," America, 1832; the first locomotive constructed in the world with the forward or "bogie" truck.

No. 35.—The "Traveller," America, 1835; original locomotive, and the first in the United States built expressly for freight purposes. This engine has a record of sixty years of actual service, a locomotive record without a parallel in history.

No. 36.—Full size working reproduction of the "Hercules," America, 1837; the first locomotive in the world with equalizing frame and levers.

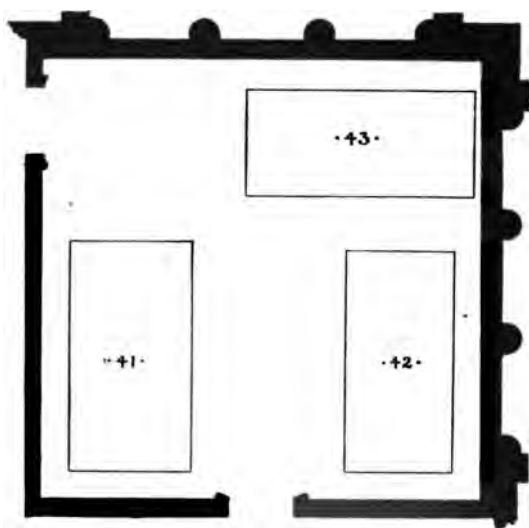
No. 37.—The "Thomas Jefferson," America, 1836; an original locomotive of the "Grasshopper" type, the first with cab for engineer and fireman, and the first Winans engine.

No. 38.—The "Mazeppa," America, 1837; original locomotive, and first of the "Crab" type.

No. 39.—Full size working reproduction of the "Campbell," America, 1836; the first or father of the American type of eight wheel passenger locomotive.

No. 40.—Full size working reproduction of the "La Fayette," America, 1837; the type of the first Norris locomotive with adhesion sufficient to surmount heavy grades.

On the Walls, photographs by Wm. H. Jackson and retouched by Thomas Moran, of the cities of Pittsburgh and Washington. Also a series of original wash-drawings, showing the development of the locomotives of the world. Also a series of bromides from direct photographs of English historical locomotives. Another series of drawings showing the evolution of locomotives and cars of the elevated railways. Also, series of detail drawings of American and foreign locomotives.



PLAN OF HALL 48.



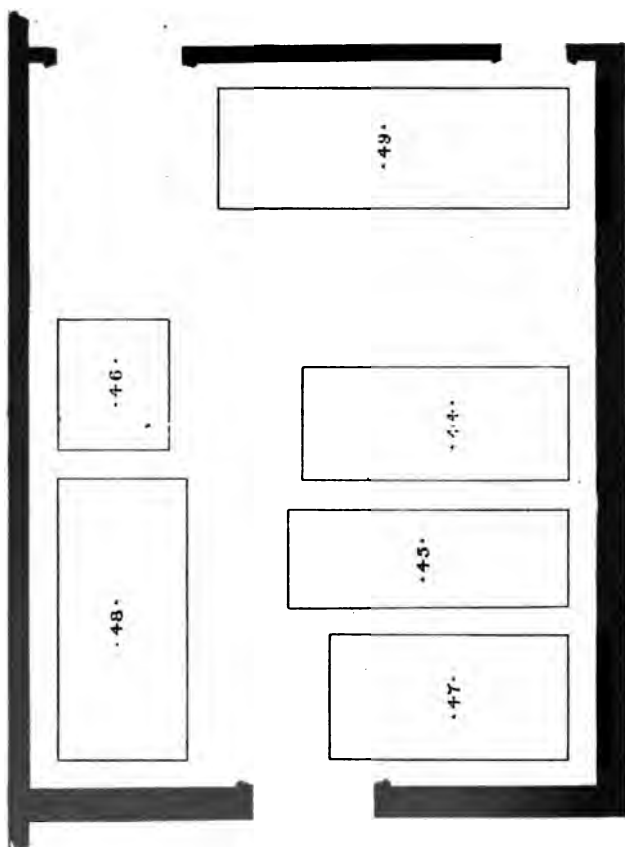
HALL 48.


No. 41.—Original locomotive, "Mississippi," built in England in 1834, imported to America in 1836, and the first locomotive in New Orleans, it standing upon a section of the original track.

No. 42.—Full size working reproduction of the "Sandusky," America, 1836; Rogers' first locomotive, and the first locomotive west of the Ohio River.

No. 43.—Original locomotive "Rocket," England, 1838; built by Braithwaite, London, and the first locomotive on the Philadelphia & Reading Railroad. Old "Number One."

Upon the Walls.—Original drawings, specifications, lithographs, and photographs, showing the development of the Rogers' locomotive; also a series of large wash-drawings, showing the development of the locomotive of the world. Also, series of photographs of railway appliances.



PLAN OF HALLS 46 AND 47. 

DOUBLE HALL 46 AND 47.

No. 44.—Original engine "Samson," England, 1838; built by Timothy Hackworth, and the first locomotive in Nova Scotia.

No. 45.—Original engine "Albion," England, 1839; built by Hackworth, and the second locomotive in Nova Scotia.

No. 46.—Original passenger car, England, 1831; sent with the "Samson" to Nova Scotia, the year named, and probably the oldest coach in its original form in existence.

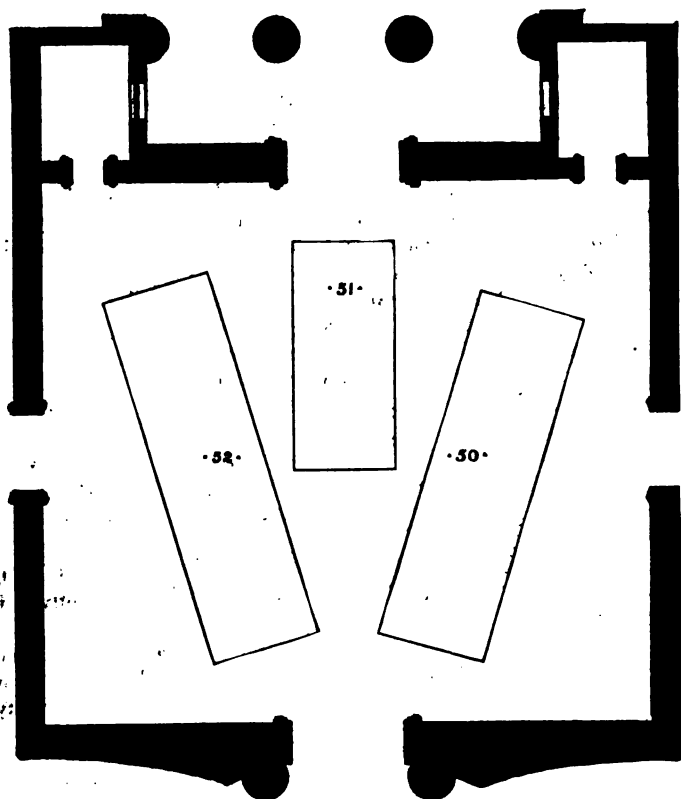
No. 47.—Full size working reproduction of the "Buffalo," America, 1844; the first locomotive in the world with 8 wheels coupled.

No. 48.—Full size working reproduction of the "Mount Clare," America, 1844; first locomotive built by the Baltimore & Ohio Railroad at its own shops, and the heaviest locomotive of its time.

No. 49.—Full size working reproduction of the "Camel," America, 1848; the first of the heavy freight locomotives in America.

49½. Collection of railroad wood cross-ties, from all parts of the world, includes such wood as mahogany, iron bark, yellow wood, and red wood, some of which have been in service twenty-seven years, and are still serviceable.

Upon the Walls, large wash-drawings, showing the development of the locomotives of the world. Also, series of bromides of railroad scenes in remote countries. Also, series illustrating the development of railroad appliances. Another series of wash-drawings, showing the development of permanent way. Also, relief map of the United States, showing the railroad lines and principal transportation lines of the sea coast and great lakes.



PLAN OF HALL 45.



HALL 45.

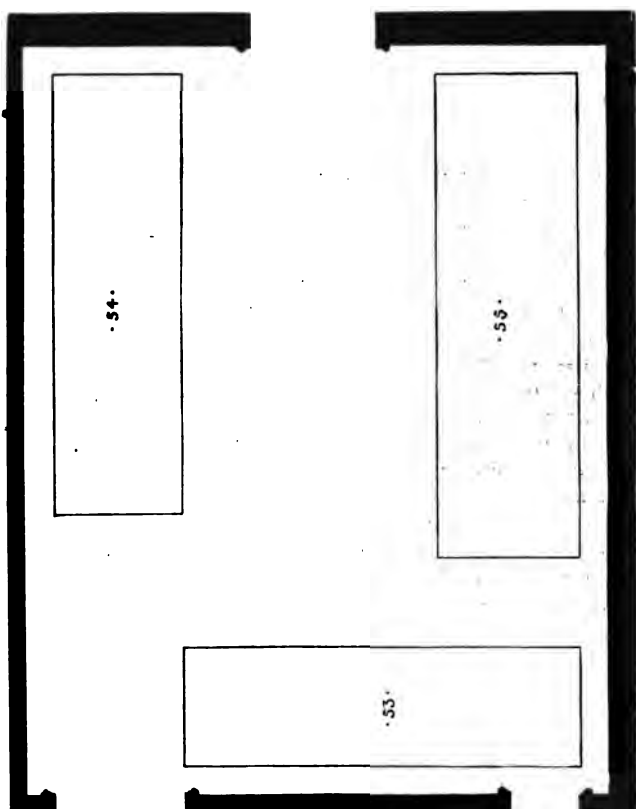
No. 50.—Original locomotive "Dragon," America, 1848; the first with rocking grate, and the oldest Baldwin engine now existing.


No. 51.—Original locomotive "Pioneer," America, 1848; the first in Chicago.

No. 52.—Original locomotive "Mason," America, 1860; one of the earliest of the distinctive American model passenger engines.

Upon the Walls, the Westinghouse series of large original drawings, showing the evolution and development of the railway brake of the world. Another series shows the development of the Pullman sleeping car, and the Wagner sleeping car.

Series of original wash-drawings illustrating the evolution and development of permanent way. Series of drawings and photographs showing exterior and interior views of the royal trains of the world. Series showing development of motive power on the Illinois Central Railroad from 1832 to 1893. Series indicating the development of locomotives and cars on the New York Elevated Lines.



PLAN OF HALLS 43 AND 44. 

DOUBLE HALL 43 AND 44.

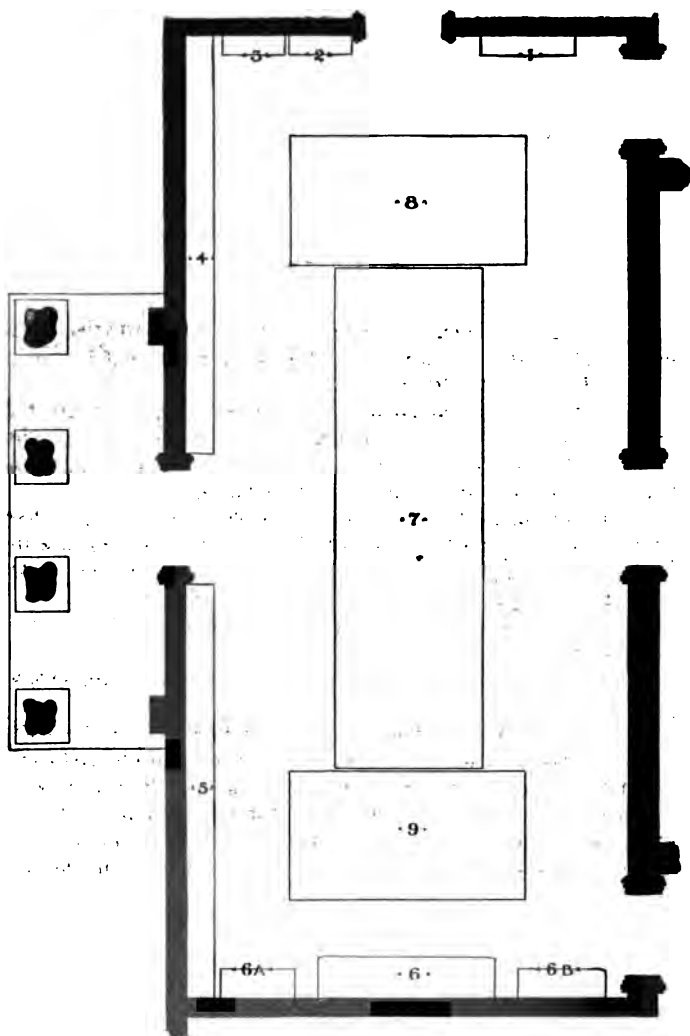
No. 53.—Original 10-wheel "Camel" locomotive, America, 1852; the first of this type of heavy engines.

No. 54.—Original locomotive "Perkins," America, 1862; the first of the special type for climbing the heavy grade of the Allegheny Mountains.

No. 55.—Original locomotive No. "600," America, 1876; the first passenger mogul. This engine was in the Centennial, at Philadelphia.

On the Walls, series of large original wash drawings, showing the modern compound locomotives of the world. Series of original drawings and lithographs of historical engines, cars, and appliances. Series illustrating development of the leading foreign manufactures of locomotives, cars, and appliances. Series of direct tracings, fourteen in number, from the original drawings of George Stevenson's locomotives. Series furnished by the German government, indicating the development of German motive power and equipment. The "West" series complete, consisting of fourteen plates, showing, in detail, the evolution and development of the English locomotive.

On Platform.—First chilled steel locomotive tires made in the world. Collection of modern railway appliances, permanent way.



PLAN OF HALL 41.



HALL 41.

Cases 1, 2, and 3.—Containing samples of material tested by department of chemical and physical tests of the Pennsylvania Railroad Company.

Case 4.—Relics of early railroad days—lanterns, headlights, pieces of track, etc., etc.

Case 5.—Models showing early train signal and early block signals, together with rails, section of track system, switches, and frogs.

No. 6.—The original Saxby and Farmer interlocking switch. This is the earliest successful switch ever used in America.

Stand 6A.—Relics of early rail joints, car springs, etc., etc.

Stand 6B.—Relics of early track appliances, etc., etc.

No. 7.—Original Camden & Amboy car, 1836, standing on the original block stone and the original rail of that period.

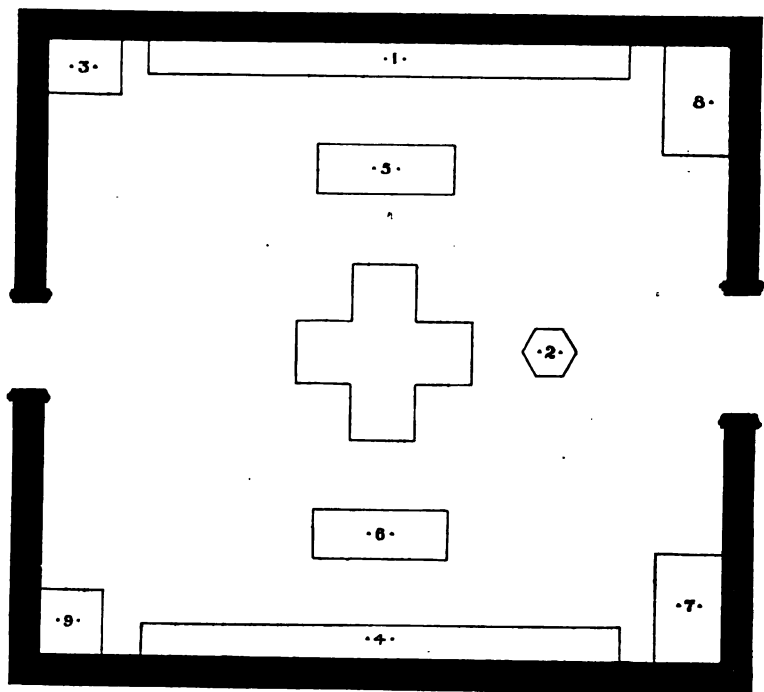
No. 8.—An original section of early wooden stringer and strap-rail construction, together with one of the original driving wheels of the "John Bull" locomotive, 1831, and wooden switch lever, with signal and cross, 1835; also a pair of cast iron wheels on axle, passenger equipment, 1846, and specimens of early railroad track.

No. 9A.—Section of original "T"-rail track, laid on original stone block and ties, Old Portage Railway.

Nos. 9B and 9C.—Two pair Camden & Amboy wooden passenger car wheels, 1848.

No. 9D.—Freight car wheel, with split-hub keyed to the axle. On the east side of the car are old rails, etc. On the west side are models of early railroad appliances.

No. 9E.—Collections of small sections of original rails from Amboy Div. Pennsylvania R. R. showing the development of the rail from 1831 to 1893.



PLAN OF HALL 57.



HALL 57.

Case 1, North Wall.—Models of the original "John Bull" and train, 1831. Model of the locomotive "John Stevens," 1825. Model of the locomotive "George Washington," the first locomotive to climb a heavy grade, built by Wm. Norris & Co., 1838. Model of the locomotive "Herald," the first on the Baltimore & Susquehanna Railroad, 1831. Model of the locomotive "Lancaster" and train, built by Baldwin, 1834. Model of passenger car "Victory," 1834. Model of ambulance car used during the war, 1862. Models of baggage and passenger cars Camden & Amboy Railroad, 1850. Model of car on Portage Railroad, 1835. Model of old car used between Rahway and Newark, 1833. Model of passenger car on Portage Railroad, 1834. Series of models showing the sectional canal boats transported on railroad trucks, 1839-1850. Model of machinery of Plane No. 7, Old Portage Railroad, 1835. Model of "Conestoga" wagon. Model of old stage coach, 1825.

No. 9.—Model of monument erected at Bordentown to commemorate first movement of steam in New Jersey.

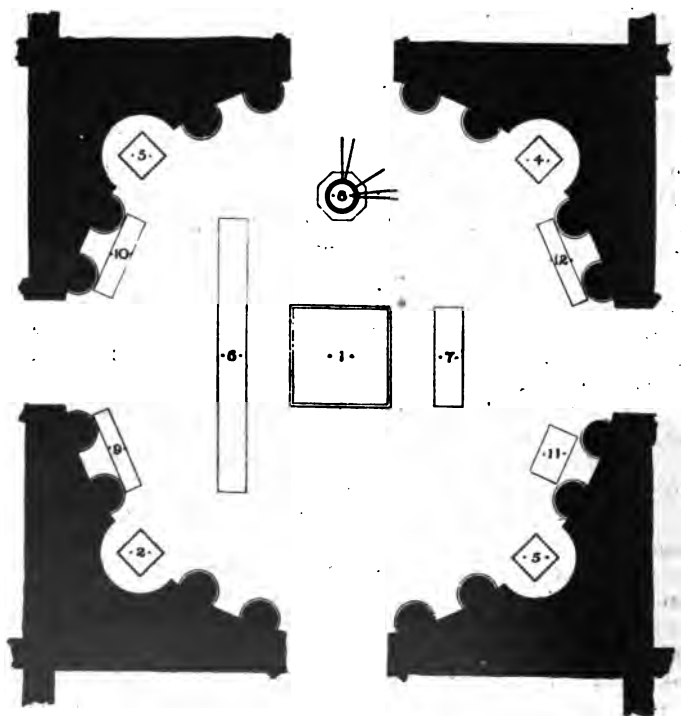
On the East Wall.—Two panels representing four centuries of progress in transportation.

Case 3.—Model of standard safety underground tunnel for passengers.

Case 4, South Wall.—Early publications and documents. Models of cars on J., M. & I. Road. Models showing modern freight cars for coal. Model of Madison Plane and rack-rail locomotive used on it, 1850. Models showing modern rail, steam lighters, methods of unloading iron ore from vessels to rail, etc., etc. Statistical model showing the Pennsylvania Railway system. Original of largest check ever drawn in an American railroad transaction.

On the North wall, models of seals of corporations, and chart of organization and badges of employees of the Pennsylvania Railroad Company.

In the Center of the Room.—Large model showing the rail crossings of the Alleghenies in the territory on which was located the Old Portage Road of 1832-1852, the New Portage Road of 1853, and the modern system of 1892.



PLAN OF HALL 58.



Case 5.—Model showing the transfer of entire freight trains New York harbor.

Case 6.—Large model of the ferry-boat "Washington," running between Jersey City and New York.

Case 7.—Relief map of Philadelphia terminals.

Case 8.—Relief map of Jersey City terminals.

Case 2.—Large globe model showing traffic of the Pennsylvania Railroad system.

About the room are six standards, holding a large number of framed relics, old posters, time-tables, notices, tickets, and receipts for fare, old reports, specifications, and advertisements. The entire aggregate of this series representing nearly 1,000 examples. Also, series of photographs of modern locomotives and views, and statue of Edgar Thompson.

EAST DOME.

Beneath the center of the dome stands a group of statuary typical of the railroad.

In the four niches are statues of Commodore Vanderbilt, Thomas Scott, John W. Garrett, and of a brakeman.

On stands are four original models of early railroad bridges by Benjamin H. Latrobe. Also model of Pontoon Railway Bridge across the Mississippi River at Prairie DuChien, Wisconsin.

Also a large working model of a locomotive and cars showing the principle of heating railway cars by the Consolidated Car Heating Co.

OF SPECIAL INTEREST.

The full size working reproductions of historical locomotives :
"Puffing Billy," 1813; Stephenson's "Rocket," 1829; "Stonebridge Lion," 1829, first locomotive seen on the American continent, 1829; Peter Cooper's "Tom Thumb," 1830; "Best Friend," 1830, first locomotive built on the American continent for active service; "Old Ironsides," first locomotive in Pennsylvania; "The Atlantic," original engine, the oldest locomotive in its original form on the American continent.

The development of the Rail and Track or Permanent Way, as illustrated by the Museum collection, represents every stage in the evolution.

The West series, showing in detail the evolution and development of the locomotive, fourteen plates in all. Halls 43 and 44.

A series of maps showing the railway occupation of the United States by decades, 1830 to 1890. Hall 49.

On the walls of Hall 56. The two largest photographs ever made in the world—The City of Pittsburgh and The City of Washington, D. C., by Wm. H. Jackson, re-touched by Thomas Moran; size, 8x32 feet

LIBRARY DEPARTMENT.

HALLS 28, 29 AND 34.

The Library Department comprises the Library (Hall 29); the Reading Room (Hall 28), and the Lecture Hall (Hall 34); and is in charge of the Recorder and Librarian, who also records all specimens entering or leaving the Museum. The Library is designed for reference purposes only, and contains many valuable scientific and technical works. These may be consulted by the general public, and will be a great aid to those desiring to pursue special study or investigation on subjects treated in the Museum. A prominent feature of this Department will be the lectures upon various scientific topics of interest and importance, which it will arrange to have given from time to time by specialists acquainted with the results of the latest research.

HALL 29.

THE LIBRARY.

The collection of books and pamphlets on the shelves already numbers nearly 8,000, and is being increased rapidly. It includes:

The Kunz Collection of works on Minerals, Gems, and Semi-Precious Stones, and containing many rare tomes on these subjects in Latin, dating back to the XVth and XVIth Centuries.

The Baltimore and Ohio Collection, collected and loaned by Mr. J. G. Pangborn. This series comprehends nearly every book treating of the origin and early development of Railways and their equipment.

The Special Library of the Department of Ethnology, obtained for the Exposition at the request of the Chief of that Department by contributions from the authors in every land. A wide range of subjects is covered, and the Library is probably one of the best of its kind in this comparatively new science.

The Skiff Collection of works, particularly on Minerals, Mining, and Metallurgy, containing many valuable books of ref-

erence. (This collection has been placed in the Departmental Library of the Department of Geology, West Annex.)

The Special Library of the Department of Mines, Mining and Metallurgy of the World's Columbian Exposition, gathered for exhibition in the Mining Building by the Chief of that Department. Among others includes sets of periodicals bearing on these subjects, and complete sets of geological publications issued by the Government.

The Collection of Russian Works on Forestry, presented by the Imperial Russian Commission to the World's Columbian Exposition.

Valuable accessions to the Library have been furnished by the following: J. E. Watkins, F. C. Baker, H. K. Coale, British Commission, Board of Lady Managers, Board of Education of the Presbyterian Church, W. B. Conkey & Co., Ceylon Commission, A. F. Dewey, Geo. R. Davis, T. W. Egleston, French Commission, German Commission, W. Guerback, J. F. Halloran, Illinois Commission, Kansas Commission, Missouri Commission, Norwegian Commission, New South Wales Commission, Pennsylvania Railroad Company, W. G. Sutherland, Spanish Commission, D. F. Schloss, George Souee, Switzerland Commission, Schloss & Cowhan, Jacob Wile.

Upon the cases are the busts of the eminent scientists and naturalists: Geoffry St. Hilaire, Galileo, Esculapius, Columbus, Cuvier, Agassiz, Humboldt, Huxley, Buffon, Hippocrates, Darwin and Linnæus.

Department Working Libraries will be established in the different departments, under the supervision of the head of the department.

The Rules give information as to the privileges of the Library:

GENERAL RULES.

1. The Library will be open every day from 9 A. M. until 4 P. M.
2. The library is entirely a library of reference. The books are to be used in the room set apart for that purpose, and not taken from it under any circumstances, excepting by the Curators for use in Working Libraries.
3. Books may be obtained by filling out the Application Slip

and presenting it at the desk. Before leaving the room the borrower shall return the book or periodical to the desk.

4. Current periodicals shall be consulted only in the Reading Room, and will not be permitted to leave the Library, excepting at the instance of Directors or Curators for use in Working Libraries.

5. Any book or periodical drawn from the General Library for Working Libraries, as provided under the Special Rules, will, upon application to the Librarian, be sent for and returned to the General Library for immediate reference purposes.

6. A set of encyclopedias, dictionaries and other general works of reference will be permanently retained in the General Library.

7. Any defacement of books is prohibited, and all losses or injuries shall be promptly adjusted to the satisfaction of the Librarian.

8. These rules shall be posted in the Library, and shall be subject to change from time to time by the Library Committee

HALL 28.

THE READING ROOM.

Here will be found the reading tables, which are supplied with magazines and periodicals pertaining more particularly to scientific, technical and kindred subjects.

HALL 34.

THE LECTURE HALL.

This is reserved for all public meetings, lectures, etc., held in the Museum. It is the intention to establish, as soon as circumstances warrant, courses of lectures on scientific and technical topics.

The semi-circular mural paintings on the sides of the room possess an intrinsic and historical value. The one on the north wall—a scene in Homeric Greece—is by Mr. F. D. Millet; the other illustrates a typical industry, that of pottery, and is by L. K. Earle. These paintings adorned the interior of the corner pavilions to the Manufactures Building, and were contributed by the Exposition to the Museum. On the west wall is a large

equestrian picture of General Winfield Scott, and opposite one of General John A. Logan—the former loaned by Robt. McMurdy, the latter by the Chicago Veteran Club. In the corners of the room are placed a heroic bust of Washington, presented by Susse Freres of Paris ; a life-sized statue of Edward M. Stanton, Secretary of War in the Lincoln Cabinet ; and the stooping figure of a Faun—a fragment of a fountain—by R. P. Bringhurst of St. Louis.

THE OFFICES OF THE MUSEUM.

THE EXECUTIVE COMMITTEE—Southwest Corner of South Court.

THE DIRECTOR-IN-CHIEF—Southeast Corner of South Court.

THE DEPARTMENT CURATORS—Northeast Corner of North Court.

CURATORS OF DIVISIONS will be found in their respective divisions.

THE RECORDER AND LIBRARIAN—Northwest Corner of North Court.

THE SUPERINTENDENT OF THE BUILDING—Southwest Corner of South Court.

THE ACCOUNTANT—Southeast Corner of South Court.

APPENDIX.

EXPLANATION:—**D.** REPRESENTS DONORS. **L.** LOAN CONTRIBUTORS. **C.** COLLECTORS.

A

Acme Cement Plaster Co. (D).
 Adams, C. F. (C).
 Admissions Department, W. C. E. (D).
 Agricultural Department, W. C. E. (C).
 Aitchison Metal Co., Robt. (D).
 Alan Wood Co. (D).
 Albion Clay Co. (D).
 Alchevskaia, Mr. (D).
 American Book Co. (D).
 American Bronze Co. (D).
 American Cement Co. (D).
 American Manufacturer & Iron World. (D).
 American Tripoli Co. (D).
 Ams, Max. (D).
 Anderson, David. (D).
 Anker, Chr. (D).
 Ardeshir & Byramji. (D).
 Arizona Commission, W. C. E. (D).
 Argentine Commission, W. C. E. (D).
 Arkansas Commission, W. C. E. (D).
 Armstrong Bros. & Co. (D).
 Armstrong, Theo. (D).
 Arctic Whaling Exhibit Co. (D & C).
 Associated Irish Railways. (D).
 Austrian Commission, W. C. E. (D).
 Ayer, Edward E. (D).

B

Bacon, G. W. Co. (D).
 Baker Car Heater Co. (D).
 Baker, Frank. (D).
 Baldwin Locomotive Works. (D).
 Ballin, Méyer. (D).
 Baltimore Journal of Commerce. (D).

Baltimore & Ohio R. R. Co. (D).
 Barnhart Bros. & Spindler. (D).
 Barton, S. W. (C).
 Bartlett, A. C. (D).
 Bartlett, Wm.. Sons. (D).
 Barattoni, C. A. (D).
 Bassels, Vincente, (D).
 Baur, Dr. George. (L).
 Belfast & Northern Counties Railways. (D).
 Bell, Catlett & Miller Co. (D).
 Bell, Robert. (C).
 Bent, E. J. (D).
 Bergen Port Sulphur Works. (D).
 Bertollette, D. N. (C).
 Best Bros. & Co. (D).
 Bhumgara Co. (D).
 Black Rock Mining Co. (D).
 Blake, W. P. (D).
 Blackie & Son, Limited. (D).
 Board of Education of the Presbyterian Church. (D).
 Board of Lady Managers, W. C. E. (D).
 Boas, Franz. (D & C).
 Bolton, T. L. (C).
 Booth, Vernon. (D).
 Borgner, Cyrus. (D).
 Boyden, Obadiah S. (D).
 Bowers, F. G. (D).
 Bowers, Stephen. (C).
 Bradley, Milton & Co. (D).
 Brazil Commission, W. C. E. (D).
 British Colombia Commission, W. C. E. (D).
 British Commission, W. C. E. (D).
 British Guiana Commission, W. C. E. (D).
 British India Commission, W. C. E. (D).
 Brough, Bennet H. (C).
 Brown & Co., John. (D).
 Brown, James. (D).
 Bruce, Minor W. (C).
 Buckeye Portland Cement Co. (D).
 Buchanan, James. (D).

Buell, F. T. (D).
 Bulgarian Commission. (D).
 Bunzlauer, Glasfabrik Carlswerk. (D).
 Bunzo, Fujita. (D).
 Burchard, Horatio C. (D).
 Burdette-Coutts, Baroness. (D).
 Burgland & Shead. (D).
 Bureau of American Republics. (D).
 Burrows, Daniel W. (D).
 Bush, L. L. (C).

C

Callaghan & Co. (D).
 California Commission, W. C. E. (D).
 Calverts, F. C. (D).
 Campagnie, Francaise des Mines de Laurium France. (D)
 Canada Iron Furnace Co., Limited. (D).
 Cape Colony Commission, W. C. E. (D).
 Ceylon Commission, W. C. E. (D).
 Chadwick, John W. (D).
 Chandler, Frank R. (D).
 Chapman & Hall, Limited. (D).
 Charnay, Desiré. (C).
 Cheesewright, F. H. (D).
 Cherrie, C. (C).
 Chicago Copper Refining Co. (D).
 Chicago & North-Western R. R. Co. (D).
 Chicago Veteran Club. (D).
 Childs, J. S. (D).
 Chinese Commission, W. C. E. (D).
 Chili Commission, W. C. E. (D).
 Chisholm, Boyd & White. (D).
 Coale, Henry K. (L).
 Colombia Commission, W. C. E. (D).
 Colorado Commission, W. C. E. (D).
 Colorado Fuel & Iron Co. (D).
 Columbian Ceramic Society. (D).
 Combe, Barbour & Combe. (D).
 Connecticut Commission, W C E. (D).
 Conkey Co., W. B. (D).
 Cooke. (C).

Copper Queen Consolidated Mining Co. (D).
 Coplay Cement Co. (D).
 Corea Commission, W. C. E. (D).
 Cory Bros., Ltd. (D).
 Cowie, Isaac. (C).
 Corydon Stone Co. (D).
 Cowham, Jos. H. (D).
 Crown Preserved Coal Co. (D).
 Curacao Commission, W. C. E. (D).
 Curtis & Harvey. (D).
 Curtis, William E. (L. & C).

D

Danish Commission W. C. E. (D).
 Davenport, C. L. (C).
 Davis, Chas. T., Pub. Co. (D).
 Davis, George R. (D).
 Davis, Dr. M. L. (D).
 Deans, James. (C).
 Del Nero, Angelo. (L).
 Department of Admissions, W. C. E. (D).
 Dewey, A. F. (D).
 Doble Co., Abner. (D).
 Dorsey, G. A. (C).
 Drake Co., The. (D).
 Dunham, G. D. (D).
 Dysart, Samuel. (D).

E

East Anglian Cement Co. (D).
 East Tennessee Land Co. (D).
 Ecuadorian Commission, W. C. E. (D).
 Eells, Myron. (C).
 Egleston, Prof. T. W. (D).
 Elbers, A. D. (D).
 Electro-Automatic Appliance Co. (D).
 Emmens Metal Co. (D).
 Empire Portland Cement Co. (D).
 Ethnology Department, W. C. E. (C).
 Ethnographic Museum, Liepzig, Vienna, Berlin. (D)

F

Fairbanks, A. W. (C).
 Fandon, Manuel. (D).
 Fearn, Richard Lee. (D).
 Fernandez, Pedro. (D).
 Fernow, Prof. B. E. (L).
 Finsch, Otto. (C).
 Finance Committee, W. C. E. (D).
 Financial Despatch and Commercial Pub. Co. (D).
 Fisher, Adolfo. (D).
 Florida Commission, W. C. E. (D).
 Folonov, M., Governor of Viatka. (D).
 Foster & Son. (D).
 Fort Madison & Appanoose Stone Co. (D).
 Fowler, Enos. (L).
 Francis & Co., Limited. (D).
 French Commission, W. C. E. (D).
 French General Asphalt Co. (D).
 Frisch, Albert. (D).
 Fritsche Bros. (D).
 Fuller, F. W. (D).
 Fullers Earth Mining Co. (D).
 Funk & Co. (D).

G

Gage, Lyman J. (D).
 Galitzki, L. (D).
 Georgia Bauxite & Mining Co. (D).
 General Electric Co. (D).
 Geological Survey of Sweden. (D).
 German Commission, W. C. E. (D).
 Giesler, R. G. (D).
 Gould Coupler Co. (D).
 Goldsmith, J. S. (C).
 Government Board of Management for the W. C. E. (D).
 Government Printing Office, Berlin. (C).
 Goyard, M. (D).
 Gramm, Carl Theodor. (D).
 Greek Commission, W. C. E. (D).
 Green, C. H. (C).

Great Northern Railways of Ireland. (D).
 Gibbs Co., Limited. (D).
 Guatemala Commission, W. C. E. (D).
 Guerback, W. (D).
 Gunning, W. J. (L).
 Gutieviez, Antonio. (D).

H

Hagenbeck, Carl. (C).
 Hales, Harry. (C).
 Hall, T. P. (C).
 Hallidie, A. S. (D).
 Hamilton, W. A. (C).
 Hamilton, David G. (D).
 Hansen, Rasmus. (D).
 Hardin, Edward B. (D).
 Hardtmuth, L. & C. (D).
 Harper Bros. (D).
 Hart, Miss Lydia M. (D).
 Hassler, Dr. Emil. (C).
 Haupt, H., Jr. (D).
 Hayssen, H. H. (L).
 Hayward, Lucy L. (D).
 Heber, A. H. (D).
 Hess, Geo. H. & Co. (D).
 Heap Manufacturing Co. (D).
 Healey, Misses. (D).
 Heinze, Adolph. (D).
 Hibbard, Wm. G. (D).
 Hibner, R. (D).
 Houston, Sam H. (D).
 Horstman, Richard. (D).
 Hoerder Bergwerks & Hütten Verein. (D).
 Hoshida, M. (D).
 Hostetter, A. B. (D).
 Howell, Edwin S. (D).
 Hoppin, Capt. C. B. (D).
 Houghton, Mifflin & Co. (D).
 Hunt, Geo. (C).

I

Illinois Brick & Tile Association. (D).
 Illinois Railway Co. (D).
 Illinois Central R. R. Co. (D).
 Illinois Commission, W. C. E. (D).
 Illinois Fluor-Spar & Lead Co. (D).
 Imperial Russian Society for Encouragement of Sea
 Trading Navigation. (D).
 Imura, H. (D).
 Indiana Commission, W. C. E. (D).
 Indiana Stone Co. (D).
 Indurated Fibre Ware Co. (D).
 Institution of Empress Mary, Russia. (D).
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 Iowa Commission, W. C. E. (D).
 Iron Trade Review Co. (D).
 Irish Village (Midway). (D).
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J

Jackson, Adrian. (C).
 Jacobssen, Fillip. (C).
 Jacovkin, I. I. (D).
 Jackson, Sheldon. (C).
 Jamaica Commission, W. C. E. (D).
 Japanese Commission, W. C. E. (D).
 Japanese Tea Association. (D).
 Japanese Central Association. (D).
 Japanese Tea House. (D).
 Javanese Commission, W. C. E. (C).
 Jastrow, Prof. J. (C).
 Jessup, W. & Son. (D).
 Johns, H. W., Mfg. Co. (D).
 Johnson, Edmond. (D).
 Johnson, W. & A. K. (D).
 Johore Commission, W. C. E. (D).

K

Kaldenberg, F. W. (D).
 Kansas Commission, W. C. E. (D).

Kaven. (C).
 Kelly & Co., Limited. (D).
 Kemper, E. G. (D).
 Kentucky Commission, W. C. E. (D).
 Khakhlow, A. (D).
 Kirk, W. F. (D).
 Kirk & Son, Arthur. (D).
 Klementiev, N. (D).
 Knowlton, James. (C).
 Komada, H. (D),
 Krestovnikoff Bros. (D).
 Kuhe, R. (D).
 Kunz, George F. (D & C).
 Kyoto Tea Association. (D).

L

Landsberg, Max. (D).
 Latin-American Bureau, W. C. E. (D).
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 Louisiana Commission, W. C. E. (D).
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 Lumholtz, Carl. (C).
 Lyon & Healy. (D).

M

Mac Kay, Henry S. (D).
 Mamlock, H. (D).
 Mann Bros. (D).
 March Co., The John. (D).

Maudslay, Alfred P. (C).
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 Matsura, Kanzo. (D).
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 McDonald, A. (D).
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 McMurdy, Robt. (D).
 Meyer & Son. (D).
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N

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P

Pacific Flushing Tank Co. (D).
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 Pittsburgh Crushed Steel Co. (D).
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Q

Quebec Commission, W. C. E. (D).
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R

Rafford, J. W. (D).
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 Redlick Manufacturing Co. (D).
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 Rockhill, Wm. W. (D).
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 Rœssler & Hasslacher Chemical Co. (D).
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 Rogers Locomotive Works (L).
 Rorstrands, Aktiebolag. (D).
 Royal Persian State Railways (D).
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 Russian Cement Co. (D).
 Russian Commission, W. C. E. (D).

S

Safford, Lieutenant (C).
 Sanchez, P. (D).
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 San Juan del Rey Mining Co. (D).
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 Sling Hong. (L).
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 Smith, Norton I. (C).
 Smith, C., & Sons. (D).
 Smith, Williard A. (C & D).
 Smythe, A. H. (D).
 Smyrnoff, N. M. (D).
 Snell, Merwin M. (L).
 Society of Encouragement of Travel, Prague. (D).
 Society of German Women. (D).
 Solovien, M. (D).
 Sorip, M. (C).
 Soule, George. (D).
 South Dakota Commission, W. C. E. (D).
 South Park Commissioners. (D).
 Spanish Commission, W. C. E. (D).
 Stafford, O. C. (C).
 Starr, Frederick (C).
 Standard Oil Co. (L).
 Standard Asphalt Co. (D).
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 Susse Freres. (D).
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 Swan, Jas. G. (C).
 Swartz Iron & Metal Co. (D).
 Swedish Commission, W. C. E. (D).
 Sweet & Maxwell, Limited. (D).
 Swineford, Governor. (C).
 St. Mary's Porcelain China Works. (D).

T

Theodorovich, Mr. (D).
 Thomas, F. H., Law Book Co. (D).
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 Tichomirov, M. (D).
 Tiffany & Co. (D).
 Tiffany Pressed Brick Co. (D).
 Tisdale, A. R. (C).
 Transportation Exhibits Department, W. C. E. (D).
 Trenton Iron Co. (D).
 Trinidad Commission, W. C. E. (D).
 Truax Manufacturing Co., The. (D).
 Turkish Commission, W. C. E. (D).
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 Typen, Vauder. (D).

U

United Alkali Co., Ltd. (D).
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 U. S. Colombia Commission, W. C. E. (C).
 U. S. Department of State. (L).
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 Uribe, Abel. (D).
 Utah Commission, W. C. E. (D).

V

Vatican, The. (D).
 Venezuela Commission, W. C. E. (D).
 Venice & Murano Exhibiting Co. (D).
 Virchow, Prof. Hans. (D).
 Virginia Commission, W. C. E. (D).
 Volk, Ernst. (D).

W

Ward Natural Science Establishment. (C).
 Wagner Palace Car Co. (D).
 Walker, Mrs. S. B. (D).
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 Wallerson Rod and Reed Co. (D).
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 Warren-Scharf Asphalt Paving Co. (D).

Washington Commission, W. C. E. (D).
 Washington Memorial Arch, Committee on The. (D).
 Watano, Kichiji. (D).
 Weimer Machine Works. (D).
 Weaver, Henry E. (C & D).
 Wells, John. (D).
 Wendt, Arthur F. (D).
 Wessel, Nickel & Gross. (D).
 Westinghouse Co., The. (D).
 West, G. M. (C).
 Weston, Eugene. (D).
 Western Mineral Wool Co. (D).
 Wheeler, C. C. (D).
 White, T. & S. C. (D).
 White Cap Mining Co. (D).
 Wharton, Joseph. (D).
 Wile, J. (D).
 Wilson, E. F. (C).
 Wilson, L. H. (D).
 Wilson, S. L. (D).
 Wilzinski, L. (D).
 Winston, Fred. N. (D).
 Wisconsin Lead & Zinc Co. (D).
 Women of Cuming County, Neb. (D).
 Worcester Royal Porcelain Works. (D).
 Woodruff, Frank M. (D).
 Woodside, John W. (D).
 World's Fair Venetian Gondola Co. (D).
 Wyman Bros. (D).
 Wyoming Commission, W. C. E. (D).

Y

Yambe, Y. (D).
 Yassuminsky, V. E. & A. (D).

Z

Zimmerman, John (D).

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Abell, W. J. (D).
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Alabama Agricultural Experiment Station. (D).
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Arizona Agricultural Experiment Station. (D).
Aurelio, L. (D).
Avrentiev, J. S. (D).
Aynazian, T. (D).

B

Baker, Wm. C. (D).
Baltzer, C. E. L. (D).
Barber, E. A. (C).
Barr, A. W. (D).
Baumgarten, Wm. & Co. (C).
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Brooks Locomotive Works. (D).
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Bureau of Music, W. C. E. (C).

C

California Agricultural Experiment Station. (D).
Calvo, J. B. (D).
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 Clark, G. A., & Bros. (D).
 Colliery Engineer Publishing Co. (D).
 Colorado State School of Mines. (D).
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 Cooper, E. R. (D).
 Cormier, C. (D).
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 Cunningham, Dr. (D).

D

Davila, E. (D).
 Devoll, Mrs. G. B. (D).
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 Dunlap, Frank. (D).

E

Edwards & Co. (D).
 Egyptological Co. (C).
 Elton, (C).
 Erdmann, Eduard. (D).

F

Farrington, O. C. (D).
 Fine Arts Department, W. C. E. (D).
 Floves, General Manuel. (C).
 Frank, Dr. F. (D).
 Fry, J. W. (D).

G

Georgia Agricultural Experiment Station. (D).
 German Book Trade Exhibitors, W. C. E. (D).
 Gillingham, A. J. (D).
 Gould, J. L. (D).
 Gudewill & Bucknall. (D).
 Guion, G. Murray. (D).

H

Harlan & Hollingsworth Co., The. (D).
 Harris, Captain. (C).
 Hasson, Samuel V. (D).
 Haytian Commission, W. C. E. (D).
 Higinbotham, H. N. (D).
 Hill, J. W. (D).
 Hoffstetter, J. C. (D).
 Hoganas Coal Co. (D).
 Holgate, T. F. (C).
 Holmes, W. H. (D).

I

Illinois Agricultural Experiment Station. (D).
 Imperial State Museum of Berlin. (D).
 Indiana Agricultural Experiment Station. (D).

J

Jackson & Woodin Manufacturing Co. (D).
 Java Chicago Exhibition Syndicate. (C).
 Jeter, L. R. (D).
 Jones, A. B. (D).

K

Kansas Agricultural Experiment Station. (D).
 Kentucky Agricultural Experiment Station. (D).
 Knight, A. S. (C).
 Kochusperger, H. M. (D).
 Kofod, Mrs. A. (D).
 Kyoto Exhibiting Association. (D).

L

Lacote, E. (D).
 Lambrecht, E. (D).
 Liberal Arts Department, W. C. E. (D).
 Lima Locomotive and Engineering Works. (D).
 Lingle. (D).
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 Lockwood, J. V. (D).
 Louisiana Sugar Experiment Station. (D).

M

Malleson Rod and Reel Co. (D).
 Manfredi, A. T. (L).
 Maryland Agricultural Experiment Station. (D).
 Massachusetts Agricultural Experiment Station. (D).
 Massamore, Dr. G. W. (L).
 Mayo, John B. (D).
 McCormick, E. O. (D).
 McCormick Harvesting Machine Co. (D & L).
 McGregor, H. B. (D. & C).
 McHugh, D. C. (D).
 McMurdy, Robt. (D).
 Meier, J. (C).
 Mertens & Co. (D).
 Metz, D. C. L. (C).
 Millspaugh, C. F. (D. & L).
 Minnesota Agricultural Experiment Station. (D).
 Mississippi Agricultural Experiment Station. (D).
 Missouri Agricultural Experiment Station. (D).
 Montague, H. B. (C).
 Museum of Natural History of Lyons, France. (D).

N

Nakamura, K. (D).
 National Tube Works. (D).
 Nevada Agricultural Experiment Station. (D).
 North Carolina Agricultural Experiment Station. (D).
 New Jersey Agricultural Experiment Station. (D).
 New Mexico Agricultural College. (D).
 New York Agricultural Experiment Station. (D).
 Nicholas, Bishop. (D).
 North Dakota Agricultural Experiment Station. (D).
 Nuttal, D. (D).

O

Ohio Agricultural Experiment Station. (D).
 Ohio State Archæological and Historical Society. (D).
 Ondudink, F. A. (D).
 Oregon Agricultural Experiment Station. (D).

P

Pangborn, J. G. (L. & C).
 Paraguay Commission, W. C. E. (D).
 Parmalee, H. P. (L).
 Parsons, E. A. (D).
 Patton, Mrs. Emma. (C).
 Peake, Thomas. (D).
 Pendleton Glass Tube Works. (D).
 Pennsylvania Agricultural Experiment Station. (D).
 Pennsylvania State College. (D).
 Pense, George B. (D).
 Portland Company, The. (D).
 Prince, George. (D).
 Pritchard, R. B. (D).

Q

Quicksilver Mining Co. (D).

R

Ramapo Iron Works. (D).
 Reed, Lieut. Hugh T. (L).
 Rhode Island Agricultural Experiment Station. (D).
 Rice, Col, Edmund. (D).
 Richards, E. J. (D).
 Riggs, W. W. (C).
 Royal Prussian Porcelain Works. (D).
 Royal Museum, Berlin, Germany. (D).
 Ruddiman & Johnston. (D).
 Russian Minister of Ways of Communication. (D).

S

St. Boniface College, Rome. (L).
 Sabastian, John. (D).
 Salt Union, Limited. (D).
 Savage, I. (D).
 Sawyer. (C).
 Schmidt, C. B. (C).
 Schoen Manufacturing Co. (D).
 Shoe and Leather Division, W. C. E. (C).

Shurtleff, Harvey. (C).
 Silverman, Lazarus. (D).
 Smith, Rev. E. G. (D).
 Smith, Harlan I. (C).
 Smithsonian Institution. (D).
 Society of Cliff Dwellers Archæology of America. (C).
 Stafford, E. O. (C).
 Stevison, Dudley. (D).
 Straits Settlements Commission, W. C. E. (D).
 Street Railway Review Publishing Co. (D).
 Stubel. (C).
 Sutherland, W. G. (D).
 Suwa, Professor. (D).
 Swiss Commission, W. C. E. (D).

T

Tabor, R. G. (C).
 Texas Agricultural Experiment Station. (D).
 Topakyan, H. H. (D).

U

United States Navy Department. (D).
 United States National Museum. (D).
 University of Minnesota Experiment Station. (D).
 University Museum, Oxford, England. (D).
 Uruguay Commission, W. C. E. (D).
 Ussber, C. E. E. (D).
 Utah Agricultural Experiment Station. (D).

V

Vander, Zypen & Charlier. (D).
 Vermont Agricultural Experiment Station. (D).
 Virginia Agricultural Experiment Station. (D).

W

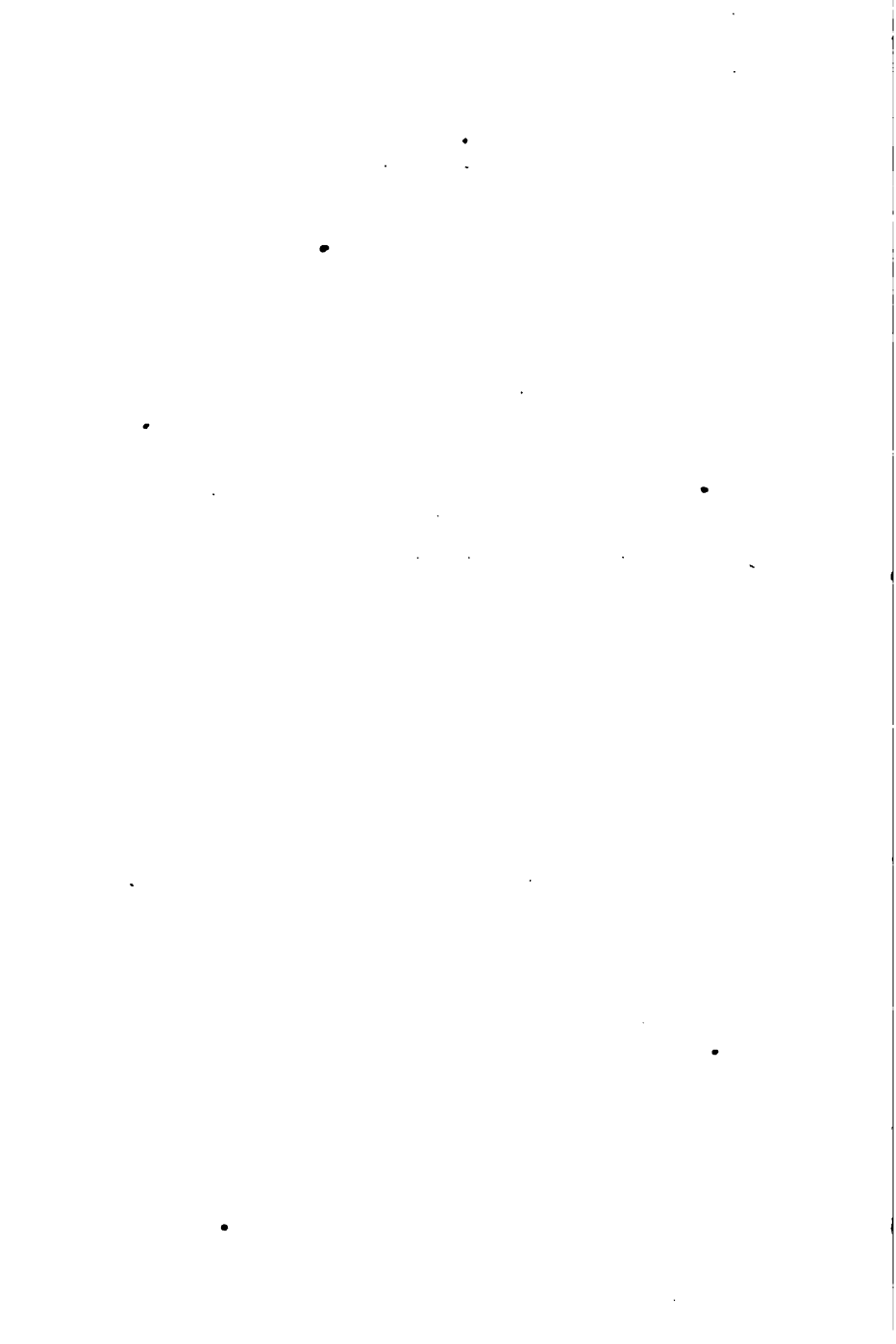
Wadsworth, H. S. (D).
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 Walkers Parker & Co. (D).
 Wason Manufacturing Co. (L).

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 Watkins, J. E. (D).
 Wells, M. (D).
 West, Thos. D. (D).
 Wisconsin Agricultural Experiment Station. (D).
 Woolson, Orosco C. Co. (D).
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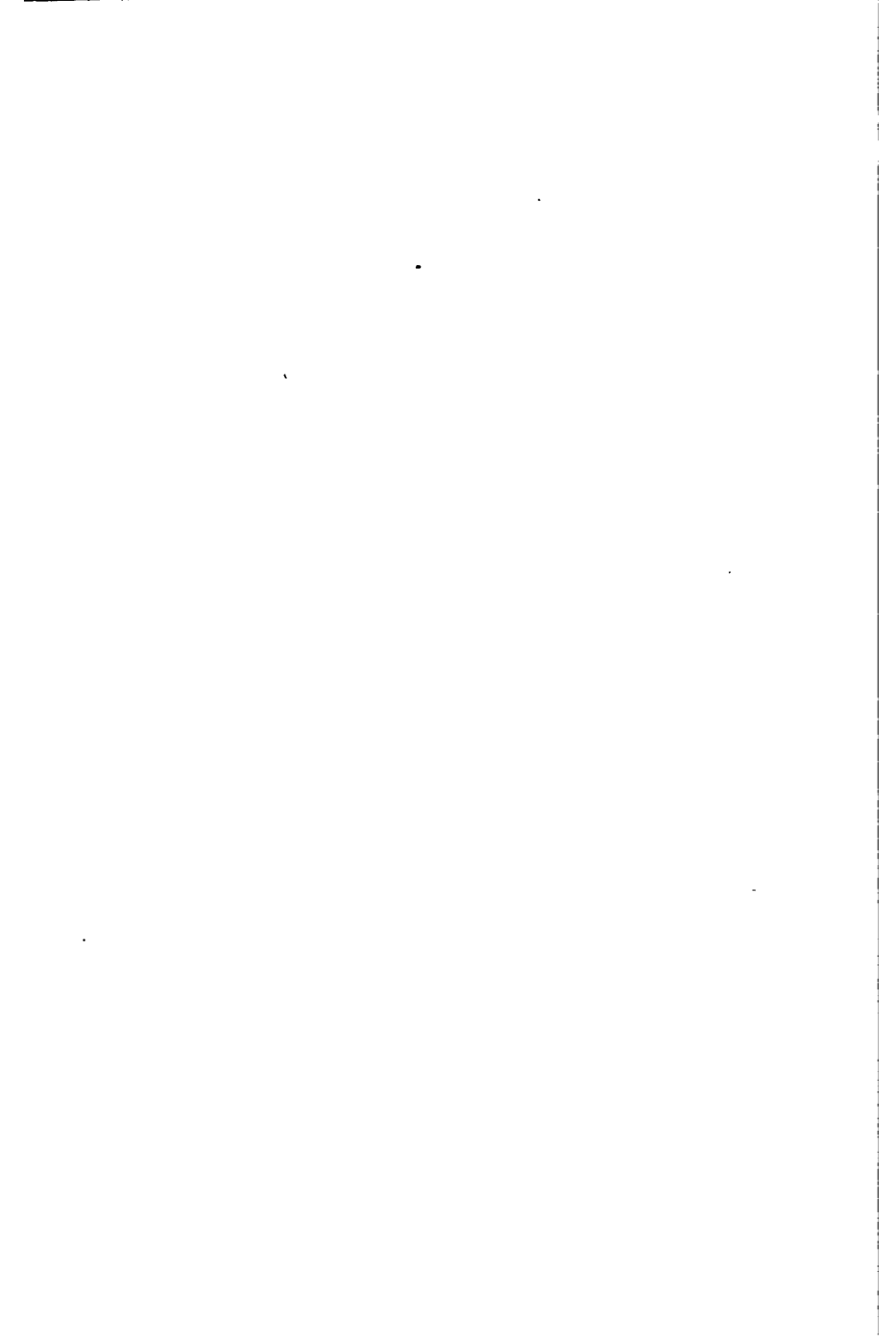
Z

Zamora, David. (D).
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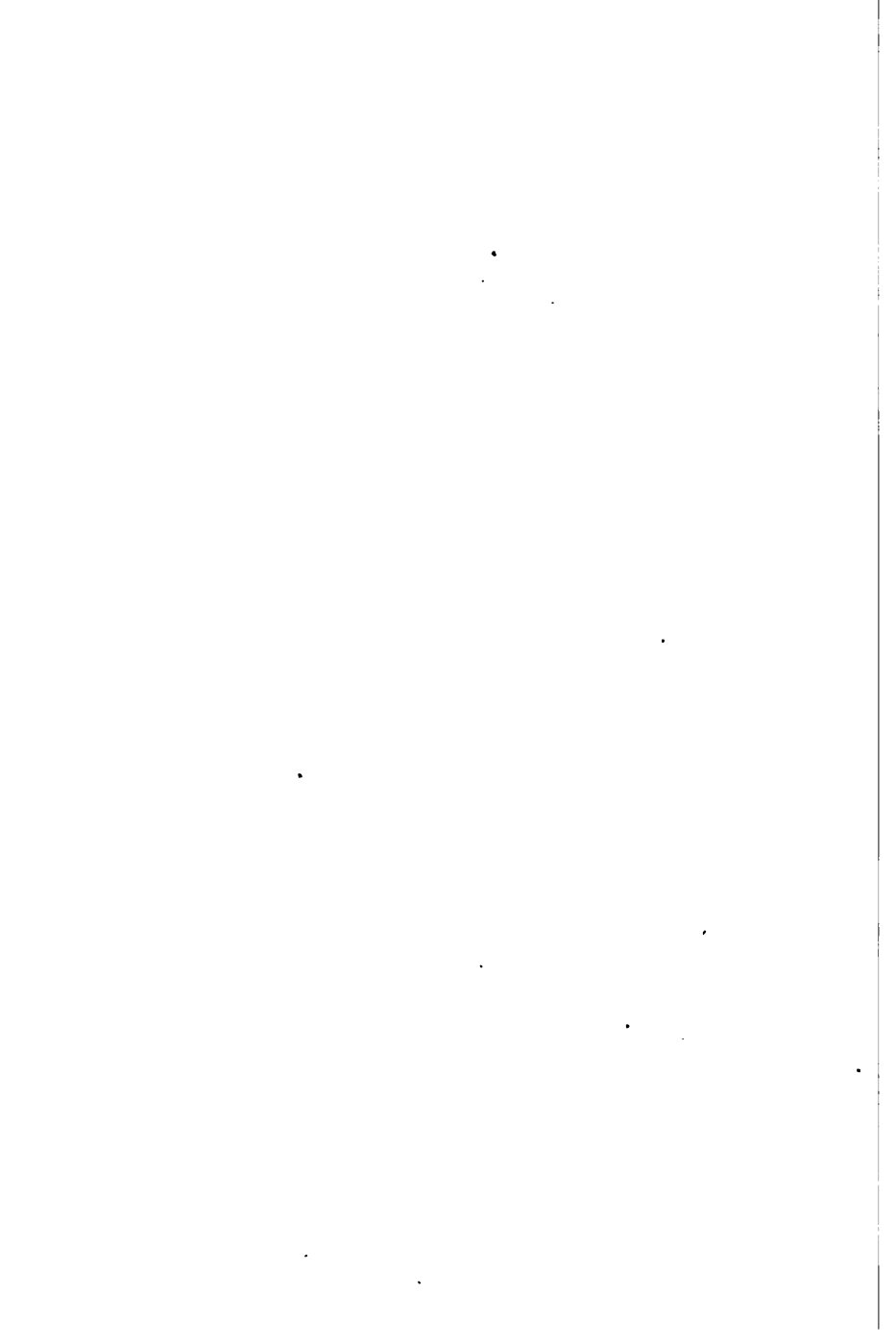
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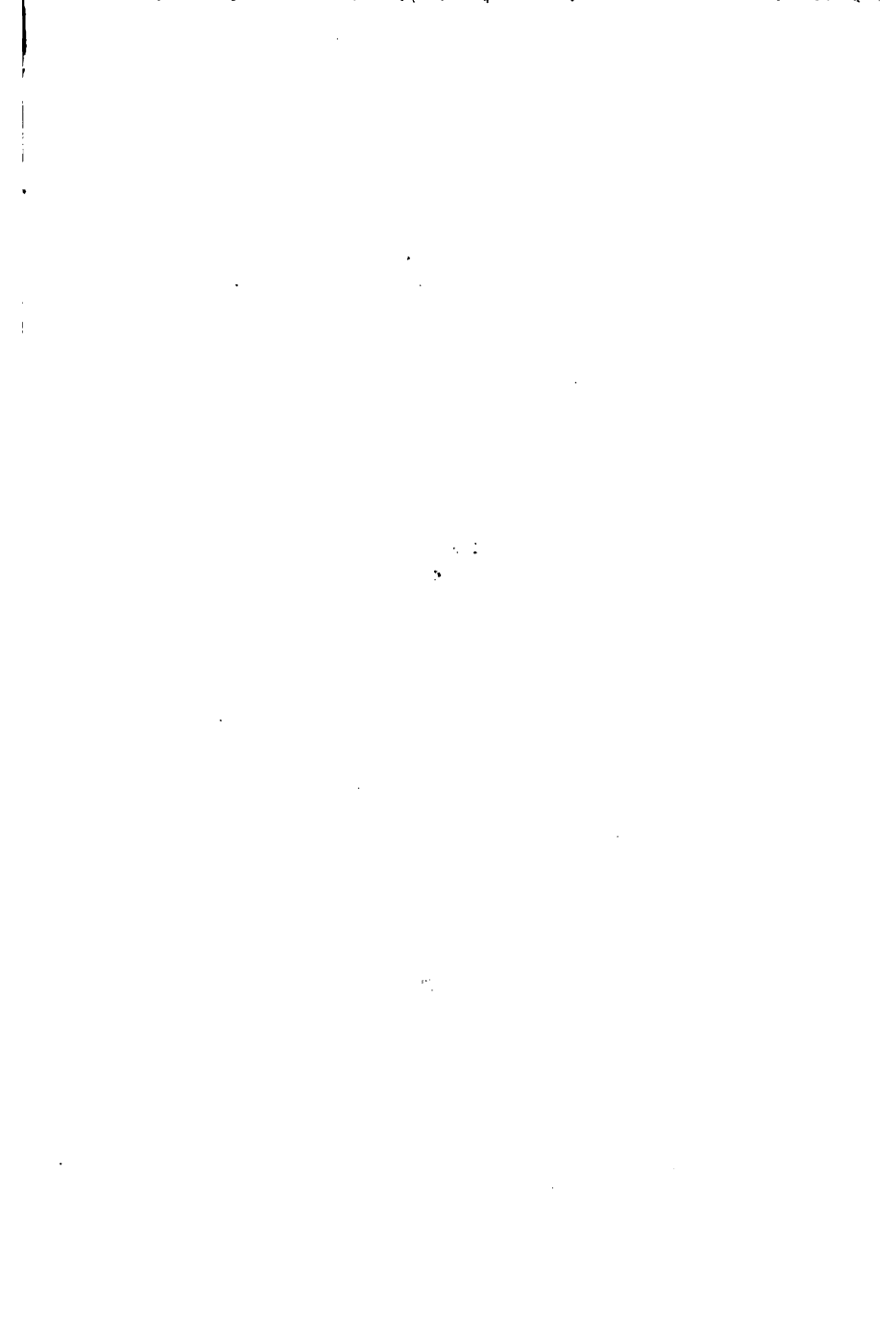


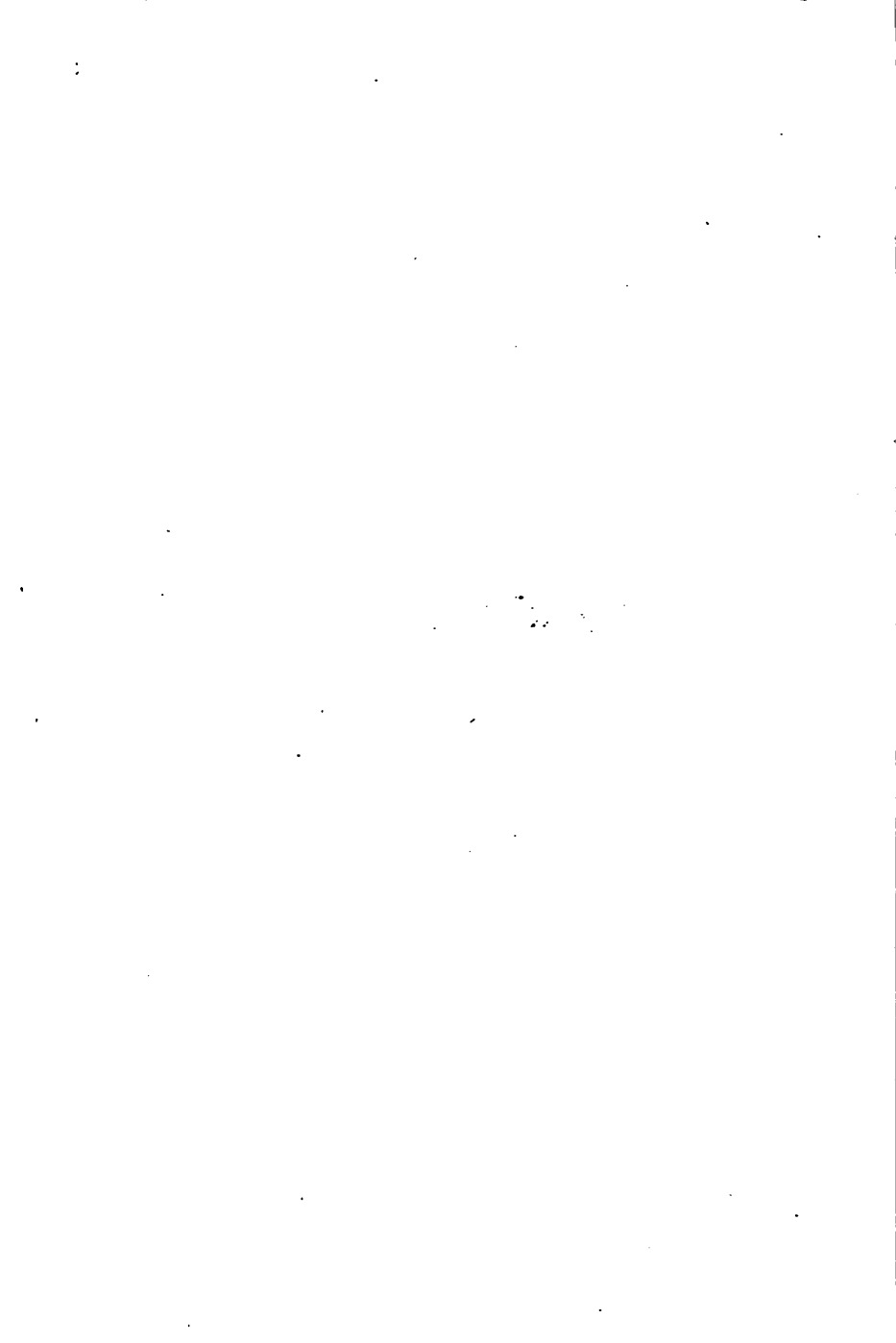












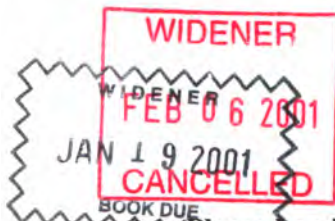
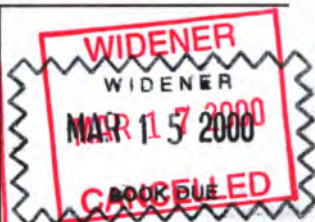
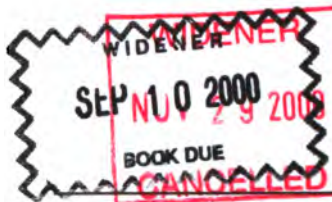


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